Débat sur le patient pluritronculaire: Angioplastie vs Chirurgie

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SYMPOSIUM CORDIS

APPAC 09/06/2011

Recentrons le débat !

- <u>Patients pluritronculaires en ST+ aigu exclus</u>:

  Angioplastie 1aire trt de choix

  Trt secondaire des lésions contro latérales fonction de critères « critiques » ou ischémiques
- <u>Patients pluritroncs en ST- « à haut risque » exclus</u> (Tn+, modifs ST, lésions avec thrombus) parce que la revascularisation doit être précoce (≤ 24h) et qu'ellle comprend un trt AAP puissant (prasugrel ou anti GP) peu compatible avec une revascularisation chir.
- En pratique, patients « stables » ou « stabilisés » médicalement

Le match est il équilibré ?

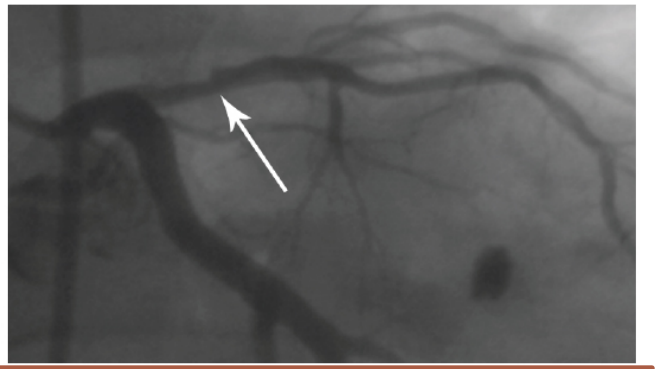
Depuis 30 ans, l'angioplasticien essaie de s'améliorer pour arriver à faire aussi bien que le chirurgien chez le pluritronculaire.

Qu'en est il aujourd'hui?

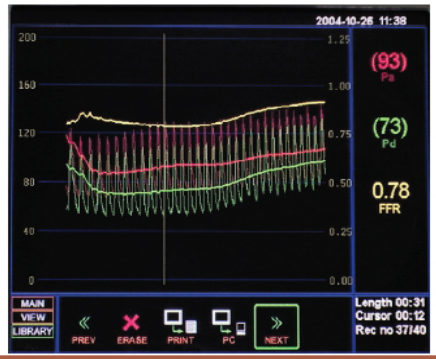
DAVID vs GOLIATH

De quoi parle-t-on? Qu'est ce qu'un pluritronculaire en 2011 ?

- Définition angiographique: présence d'une sténose de plus de 50% sur au moins 2 troncs épicardiques majeurs. En pratique 3 troncs (TCG, IVA, Cx, CD)
- Définition fonctionnelle: présence d'une sténose hémodynamiquement significative sur au moins 2 troncs épicardiques majeurs.
- FFR≤0.80: sténose hémodynamiquement significative



Lésion excentrée IVA 1



Mesure FFR sur lésion IVA 1

Étude FAME : comparaison d'une procédure standard à une procédure guidée par la mesure de la fraction de

	Angioplastie/ coro (496)	Angioplastie/ FFR (509)	p
Lésions avec une indication de stent par patient	**2,7 ± 0.9**	**2,8 ± 1.0**	**0,34**
DES par patient	**2,7 ± 1.2**	**1,9 ± 1.3**	**< 0,001**
Temps procédure (mn)	**70 ± 44**	**71 ± 43**	**0,51**
Produit de contraste (ml)	**302 ± 127**	**272 ± 133**	**< 0,001**
Coût $ US	**6007**	**5332**	**< 0,001**

Un patient tritronculaire devient bitronculaire !

Stenting in Patients with Multivessel Coronary Artery Disease Nico H.J. Pijls. NEJM2008.

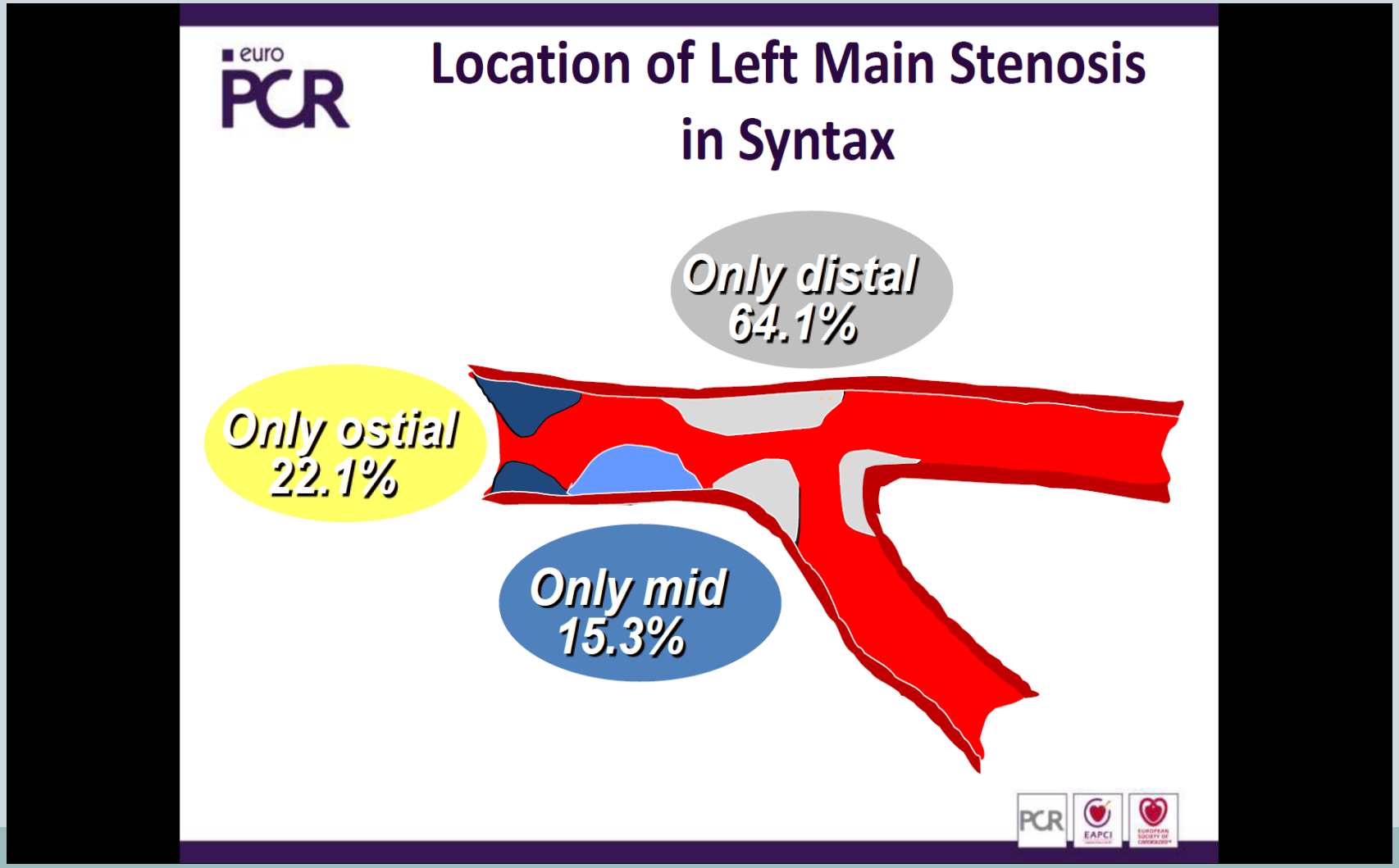
Résultats cliniques à 1 an de l'étude FAME

Critère en %	Angioplastie/ coro n = 496	Angioplastie/ réserve coronaire n = 509	p
Décès, IDM, pontage, angioplastie (%)	18,4	13,2	0,02
Décès (%)	3,0	1,8	0,19
Décès ou IDM (%)	11,2	7,3	0,04
TVR PAC ou ATL	9,5	6,5	0,08

L' utilisation de la FFR améliore les résultats de l'angioplastie avec stents actifs chez les patients pluritronculaires

Stenting in Patients with Multivessel Coronary Artery Disease Nico H.J. Pijls. NEJM 2008

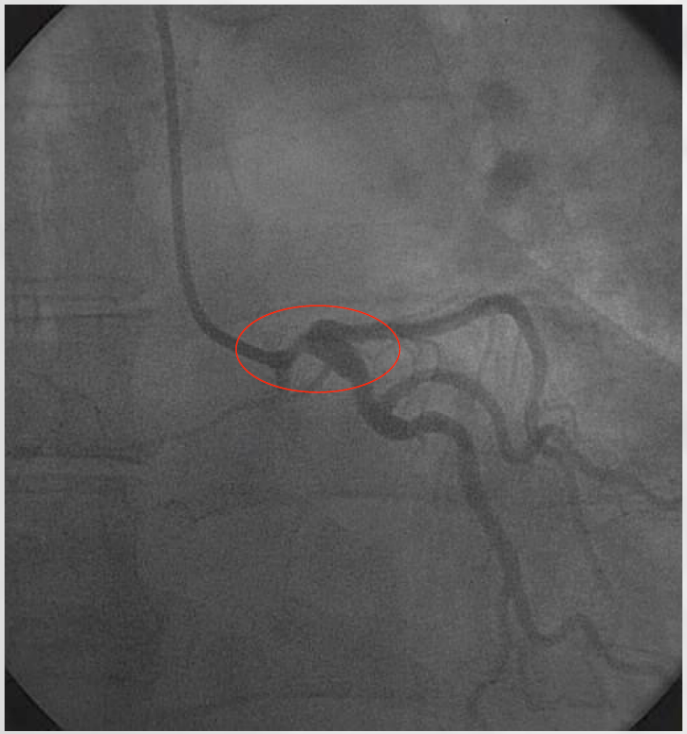
Répartition des lésions du TCG



Calcul simple du diamètre du Tronc

Registre Pilote "Tronc Taxus"

message n° 3 : Diamètre du tronc



$D_{MP} = 0.67 \times (D_{SB} + D_{MD})$

0.67 x (3.0+ 3.6) = 4.42mm

Mais si on peut faire l'IVUS, c'est encore mieux!

Le patient doit il être revascularisé ?

- Méta analyse Jeremias Am J med 2009
- 13000 pts 28 études de 1997 à 2007
- TRT médical vs angioplastie vs chirurgie
- Follow up moyen 3 ans
- Revascularisation ↘ mortalité de 26%/ trt médical
- Chirurgie ↘ de 38% $p<0.001$
- Angioplastie ↘ de 18% $p<0.01$

Comment choisir la méthode de revascularisation ?

1/ En résistant à la tentation d'une angioplastie « ad hoc » chez un patient pluritronculaire stable avec atteinte de l'IVA proximale et/ou du TCG

2/ En analysant la complexité des lésions à revasculariser (longueur, calcifs, bifs, occlusions…), atteinte TCG et IVA 1, qualité du lit d'aval, la possibilité technique d'une angioplastie.

3/ En connaissant les résultats à long terme de ce qu'on va proposer au patient

4/ En évaluant la fonction VG et la viabilité myocardique en aval des lésions (IRM, écho dobu, FFR …) en cas de dysfct VG

Comment choisir ?(2)

- 4/ En évaluant le patient :

  - Age, sexe, poids

  - Certains facteurs de risque (diabète ID ou NID, tabagisme poursuivi…)

  - Sa fonction rénale, respiratoire (BPCO)

  - Ses antécédents (maladie chronique , cancer), ses antécédents de revascularisation par angioplastie ou pontage

  - La reprise de son travail, son espérance de vie..

  - Son adhésion au traitement AAP

Comment choisir(3)

- 5/ En s'aidant:

- De scores de risque cliniques (Euroscore, STS Score), angiographiques (Syntax)
- De l'avis d'un collègue, du Cardio ou M.G. traitant
- Dans les cas les plus difficiles d'une discussion en RCP avec chir. cardiaque et anesthésiste (« Heart Team » des Recos ESC 2010 !)
- Des Recos des Stés savantes ???!!!
- Des résultats récents des Etudes cliniques bien menées
- De son expérience et de ses connaissances +++

Ad hoc percutaneous coronary intervention

Ad hoc PCI is defined as a therapeutic interventional procedure performed immediately (with the patient still on the catheterization table) following the diagnostic procedure as opposed to a staged procedure performed during a different session. *Ad hoc* PCI is convenient for the patient, associated with fewer access site complications, and often cost-effective. However, in a review of >38 000 patients undergoing *ad hoc* PCI, 30% of patients were in categories that were regarded as potential candidates for CABG. *Ad hoc* PCI is therefore reasonable for many patients, but not desirable for all, and should not automatically be applied as a default approach. Institutional protocols designed by the Heart Team should be used to define specific anatomical criteria and clinical subsets that can or cannot be treated *ad hoc*. Based on resources and settings, geographical differences can be expected. *Table 5* lists potential indications for *ad hoc* PCI. All other pathologies in stable patients, including lesions of the LM or proximal left anterior descending (LAD) artery and MVD involving the LAD artery, should be discussed by a Heart Team before a deferred revascularization procedure (PCI or CABG). *Table 6* lists the recommendations for decision making and patient information.

Table 6 Recommendations for decision making and patient information

	Class[a]	Level[b]
It is recommended that patients be adequately informed about the potential benefits and short- and long-term risks of a revascularization procedure. Enough time should be spared for informed decision making.	I	C
The appropriate revascularization strategy in patients with MVD should be discussed by the Heart Team.	I	C

[a]Class of recommendation.
[b]Level of evidence.
MVD = multivessel disease.

symptoms, to risk stratify patients with stable angina and
acute coronary syndrome (ACS), and to help choose treatme
options and evaluate their efficacy. In practice, diagnostic and pro
nostic assessments are conducted in tandem rather than sepa
ately, and many of the investigations used for diagnosis also off

5. Strategies for pre-intervention

Subset of CAD by anatomy	Favours CABG	Favours PCI	Ref.
1VD or 2VD - non-proximal LAD	IIb C	I C	—
1VD or 2VD - proximal LAD	I A	IIa B	30, 31, 50, 51
3VD simple lesions, full functional revascularization achievable with PCI, SYNTAX score ≤22	I A	IIa B	4, 30–37, 53
3VD complex lesions, incomplete revascularization achievable with PCI, SYNTAX score >22	I A	III A	4, 30–37, 53
Left main (isolated or 1VD, ostium/shaft)	I A	IIa B	4, 54
Left main (isolated or 1VD, distal bifurcation)	I A	IIb B	4, 54
Left main + 2VD or 3VD, SYNTAX score ≤32	I A	IIb B	4, 54
Left main + 2VD or 3VD, SYNTAX score ≥33	I A	III B	4, 54

Ref. = references.
CABG = coronary artery bypass grafting; CAD = coronary artery disease; LAD = left anterior descending; PCI = percutaneous coronary intervention; VD = vessel disease.

RECOS ESC 2010

Chirurgie > Angioplastie (Ia vs IIa ou IIb)

- Si atteinte IVA 1(y compris monotronc!)

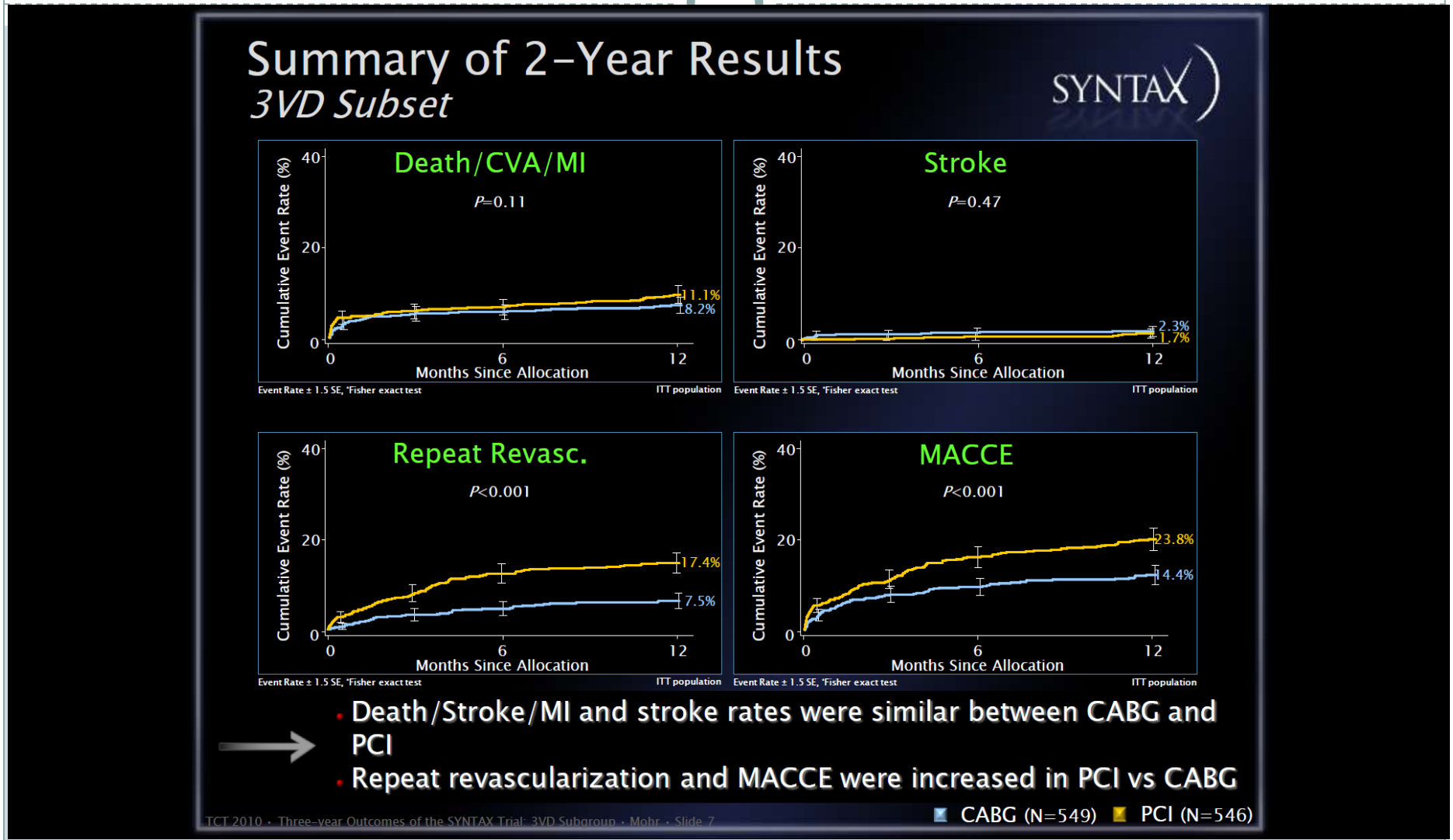
- Tri troncs simples

- Tronc isolé y compris ostial et médian !

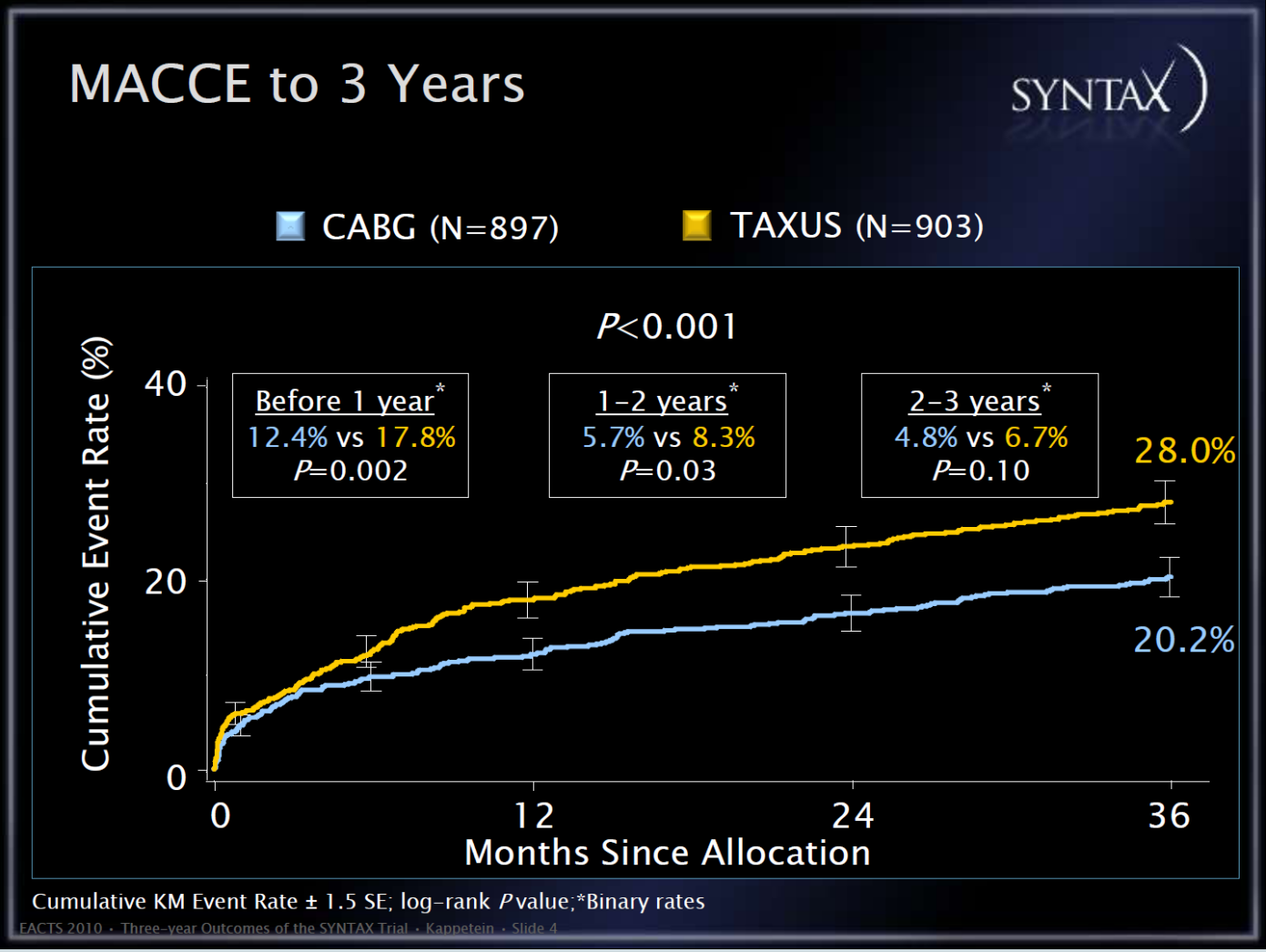
- Tronc distal (Stent IIb)

- Bien sûr, quand Syntax score > 32 ou si revascularisation incomplète, angioplastie en classe III

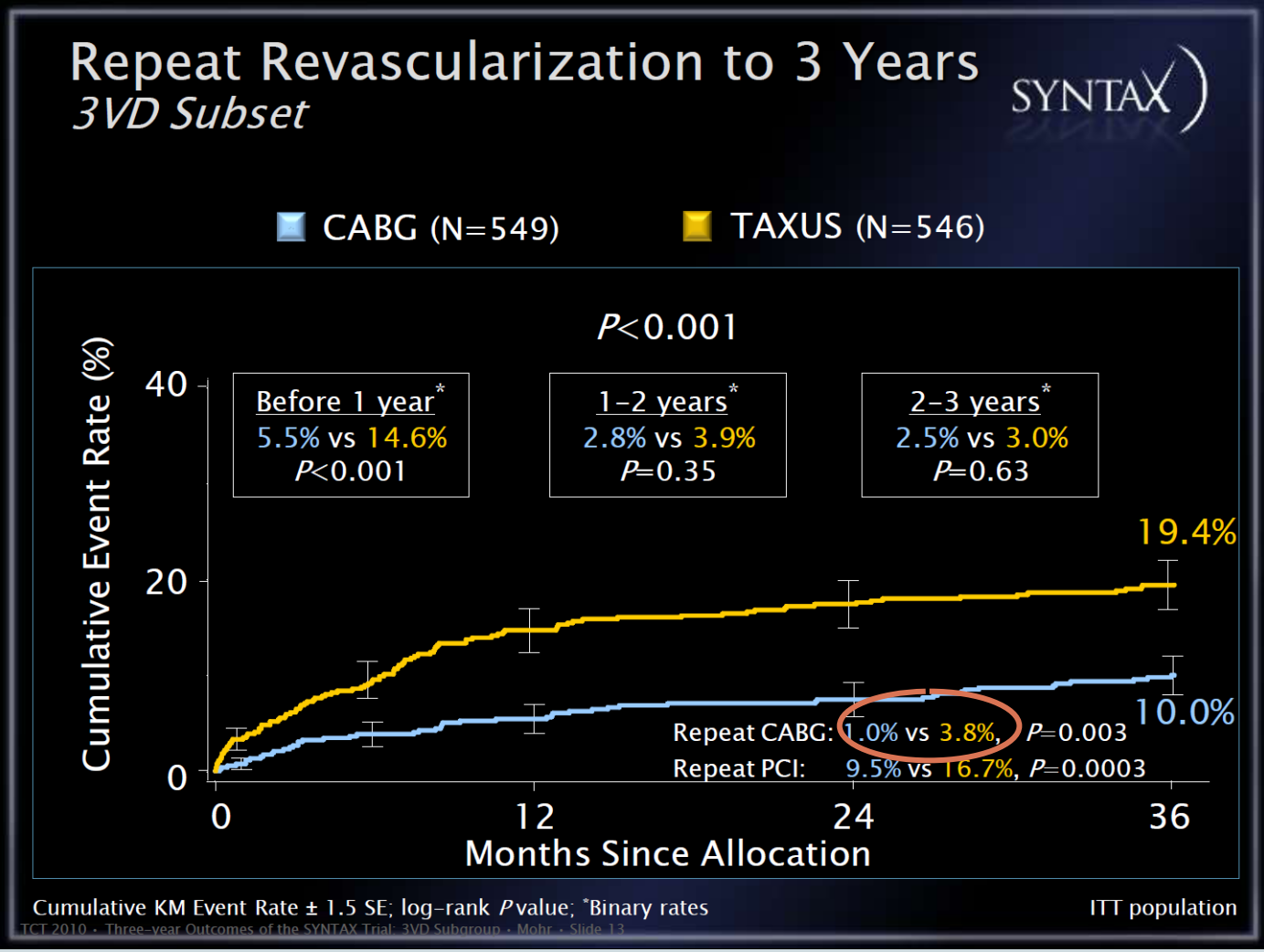
Syntax: ≠ à 2 ans que sur nouvelle revascularisation



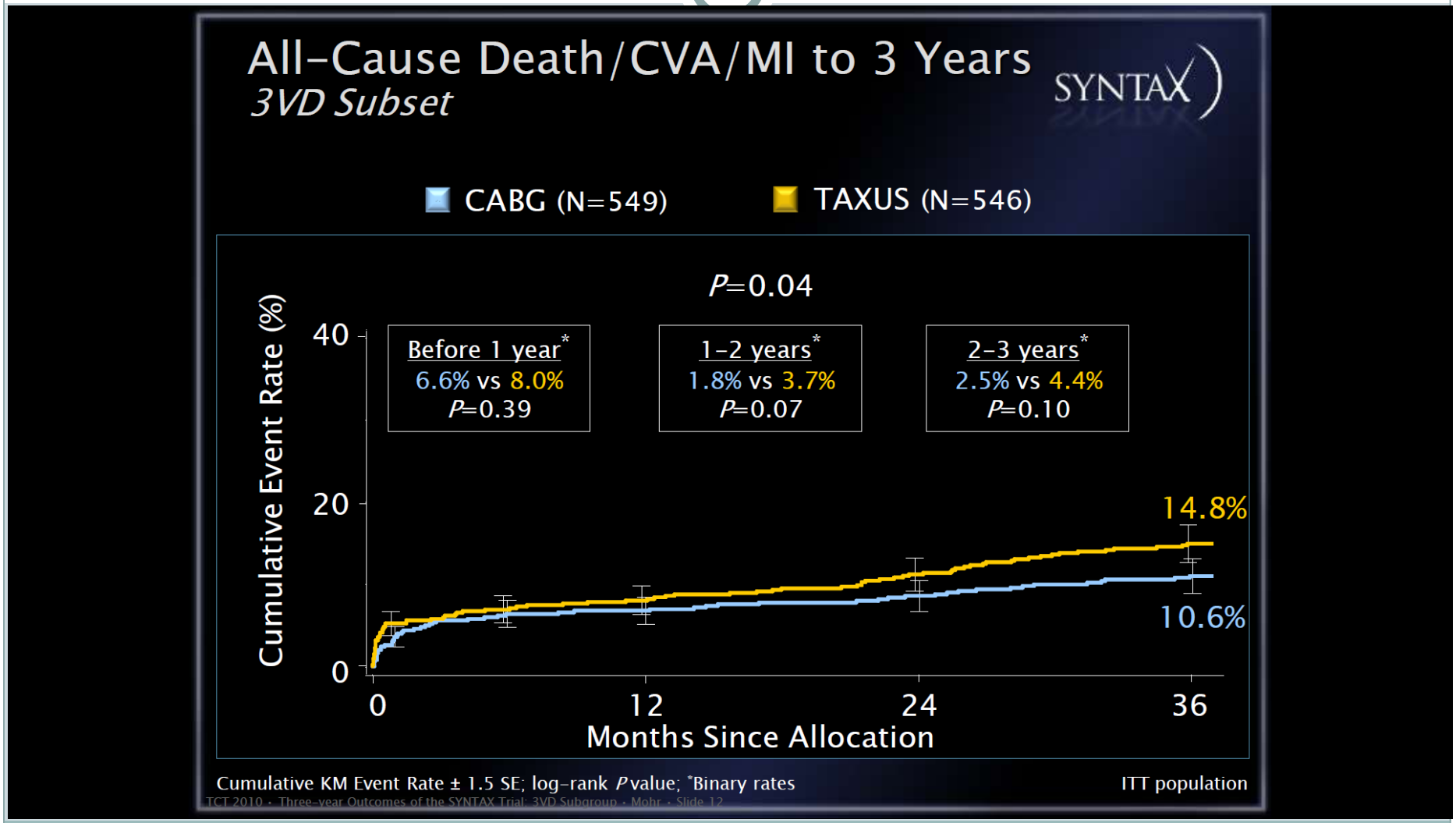
SYNTAX 3 ans: vainqueur chirurgie !



Vainqueur sur le taux de revascularisation…



Mais aussi sur les critères durs!



Est-ce que le stent est en cause?
ARTS I/II 3 ans: « hard events »

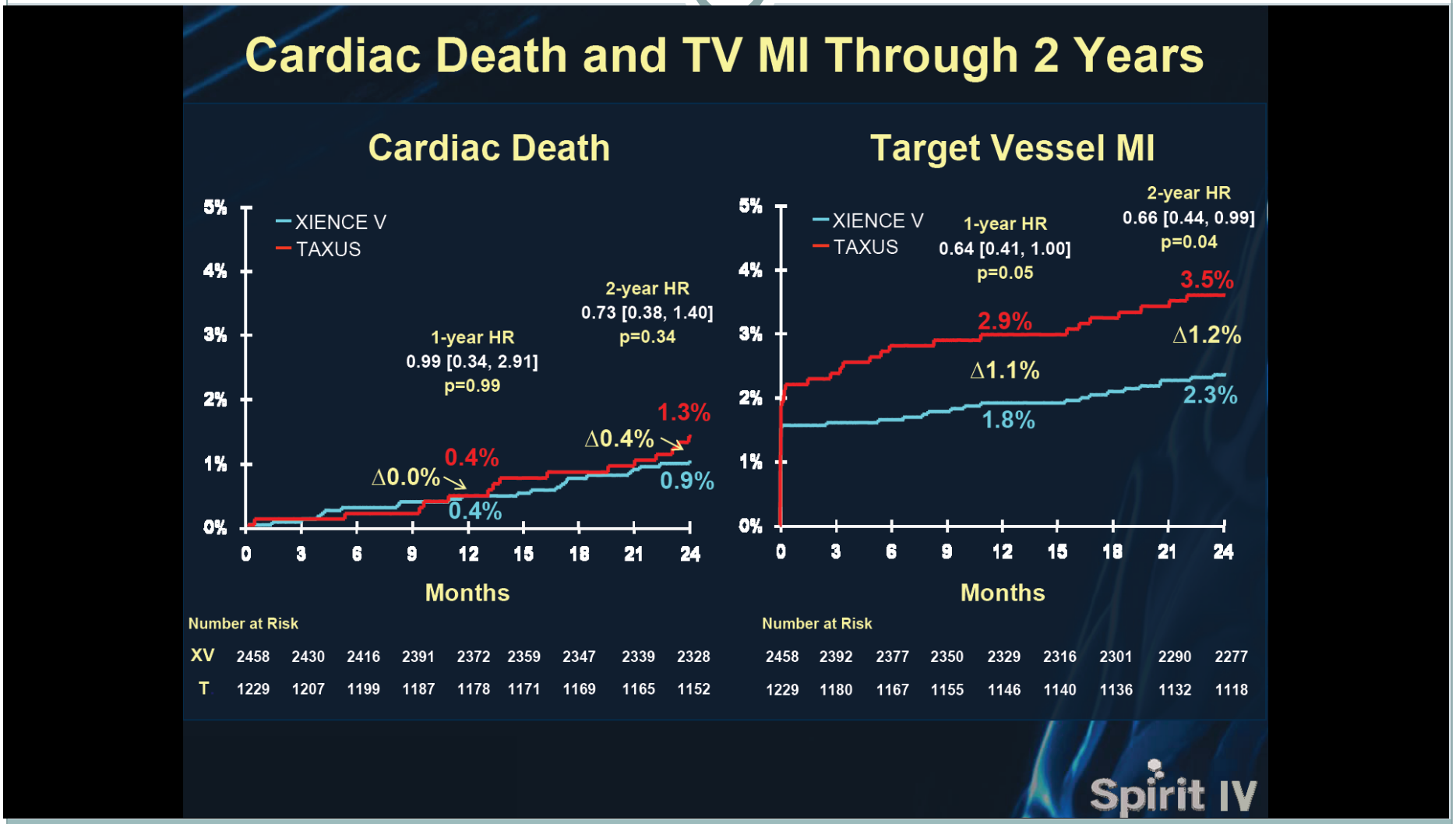
	ARTS II (SES) %	ARTS I (CABG)%	ARTS I (BMS)%
Décès	5	5.2	7.1
AVC	2.5	5.2	4.5
IDM	1.9	3.1	7.1
PAC	3.8	0	9.8
TOTAL	**13.2**	**13.5**	**28.5**
PCI	**14.5**	**4.2**	

Le Cypher® fait aussi bien à 3 ans que le pontage sauf sur la nécessité d'une nouvelle revascularisation

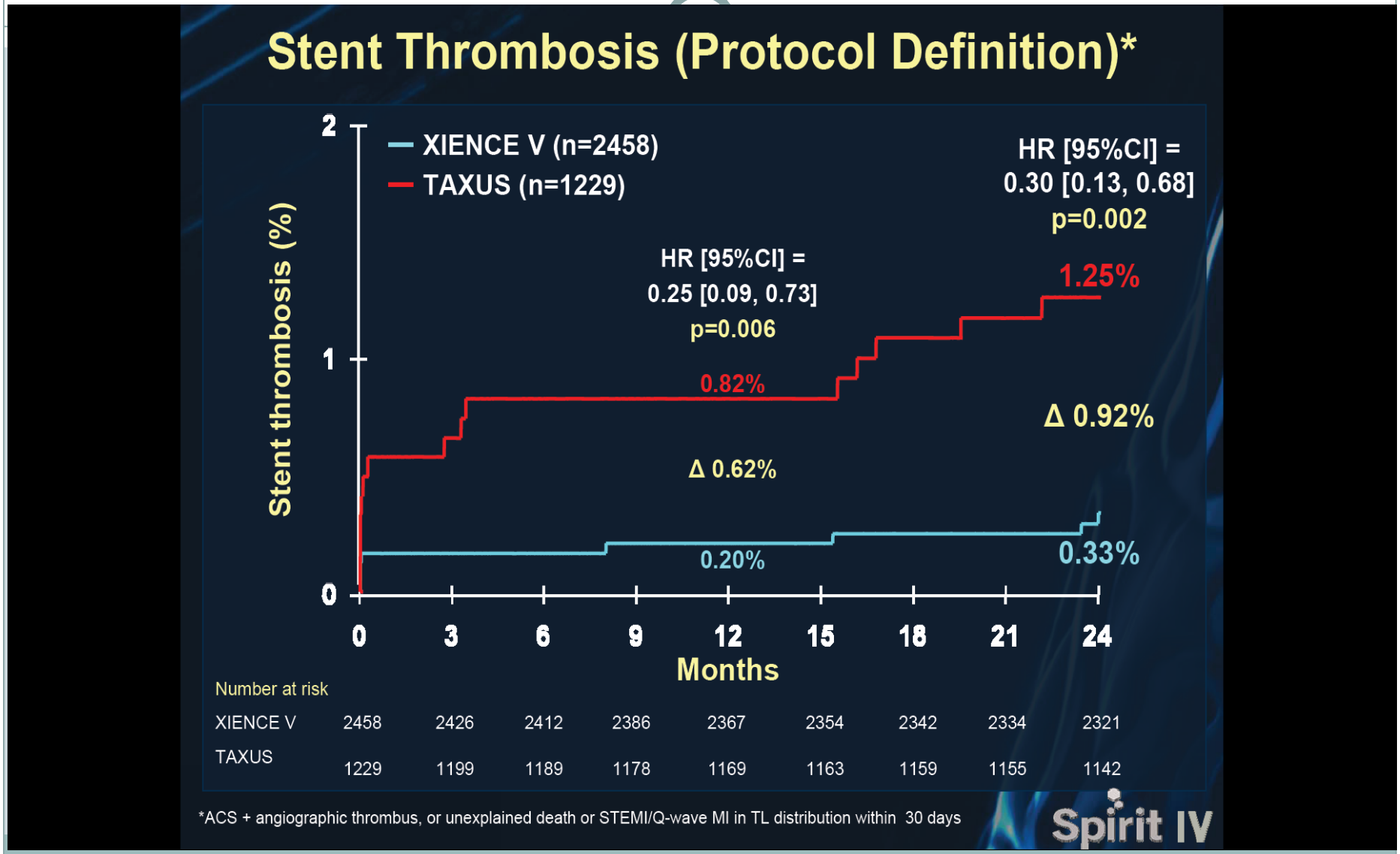
ARTS II (5 ANS) Serruys JACC 2010

- A 5 ans, le taux de survie sans IDM ni AVC est de 87.1% dans ARTS II SES, vs 86.0% dans ARTS I CABG (p = 0.1) et 81.9% dans le groupe BMS (p = 0.007).
- Nécessité d'une nouvelle revascularisation: 14.5% Cypher vs 7.1% CABG (p 0.02) vs 22.5% groupe BMS
- At 5 years, safety SES = safety CABG and >BMS

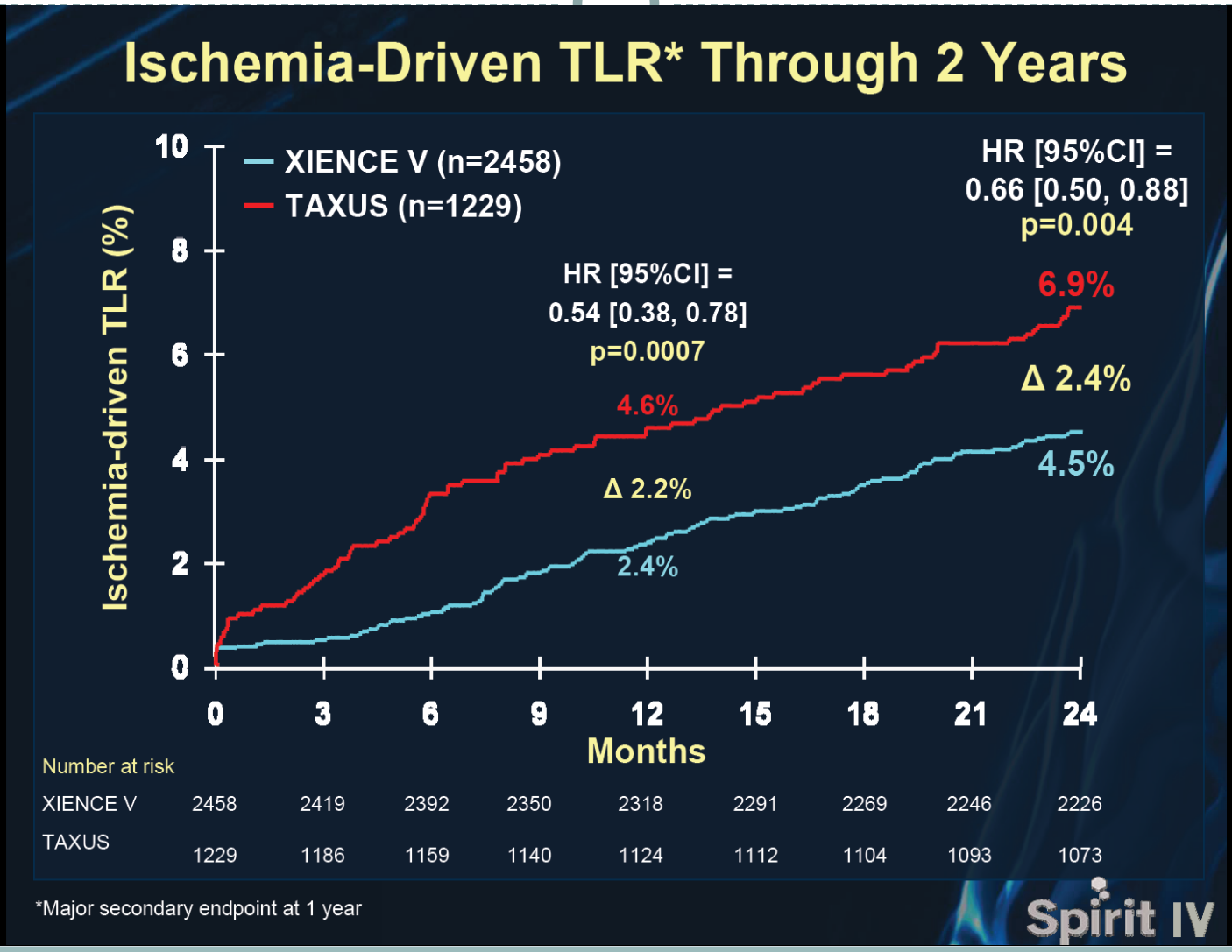
Everolimus: - d'IDMs que Taxus à 2 ans



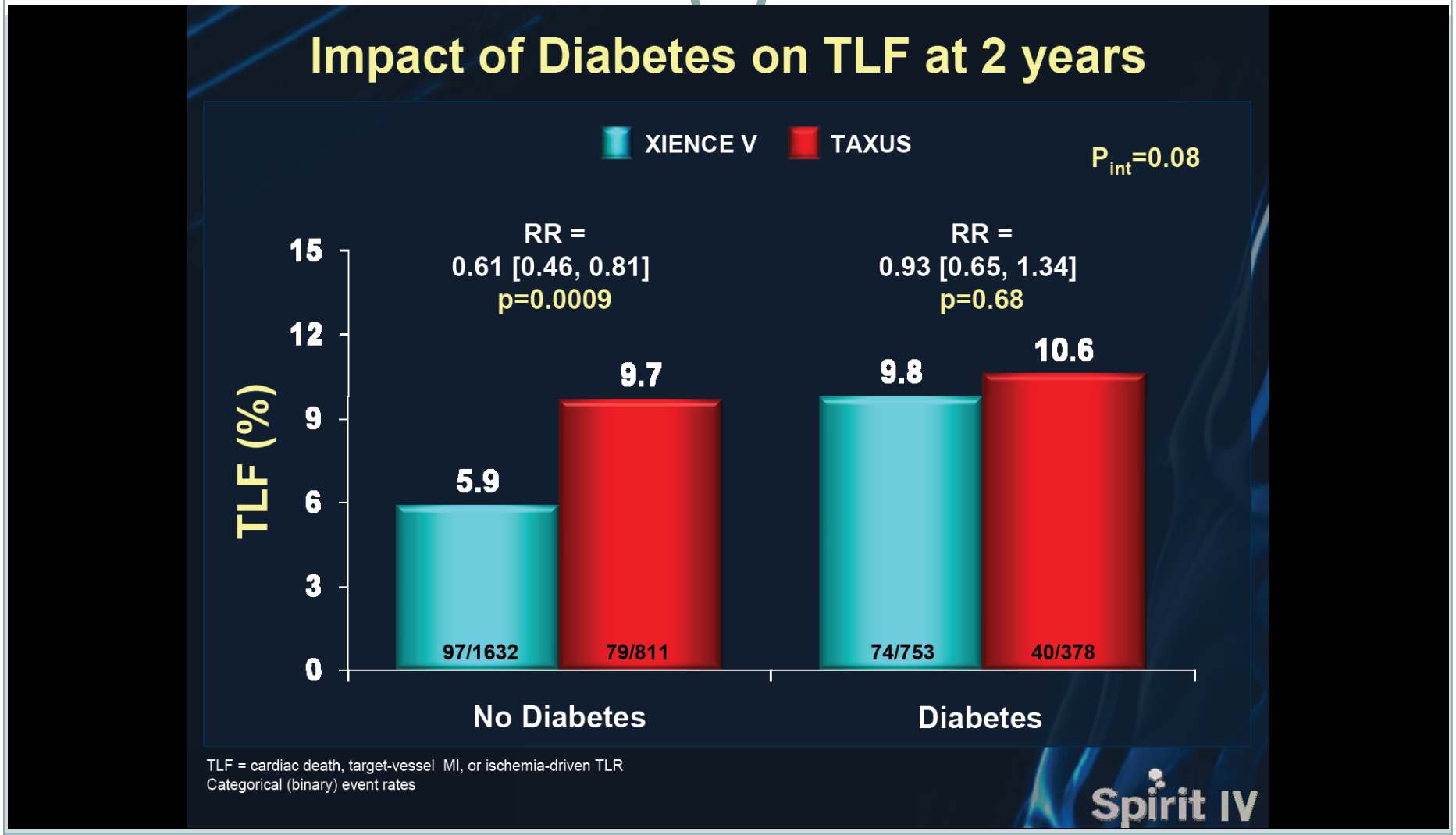
- de thromboses de stents…



- 30% de revascularisations à 2 ans



Bénéfice non retrouvé chez les diabétiques!

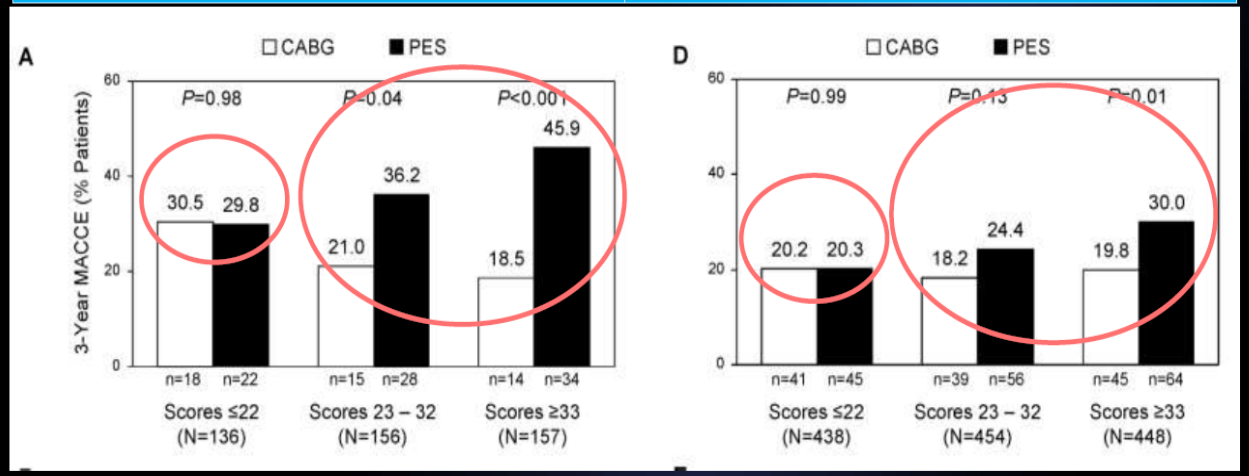


Impact du Diabète: scores interm. et élevés→chir

SYNTAX

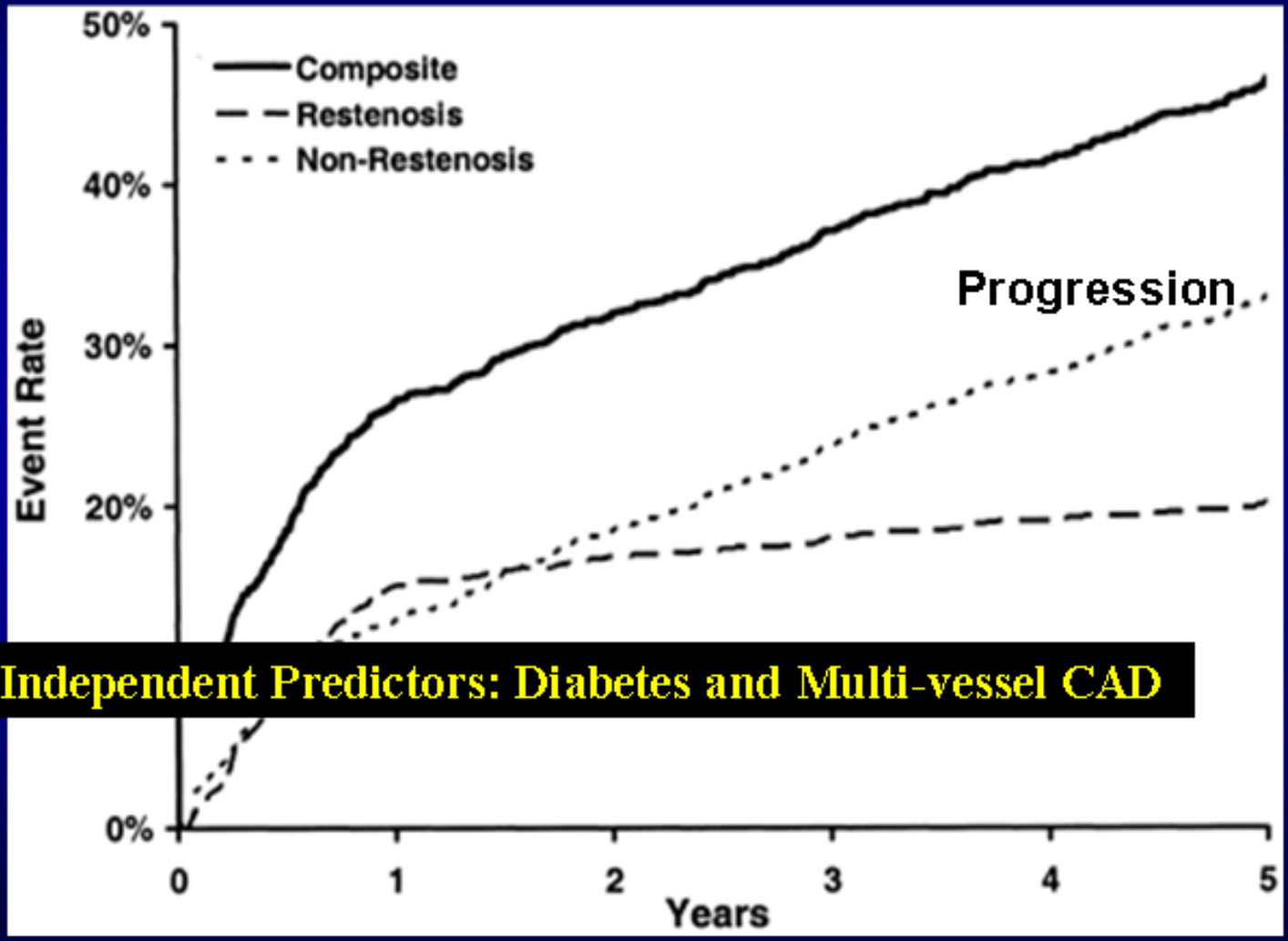
3 Year Outcomes according to SYNTAX score and Diabetic Status

Diabetes	No Diabetes



Non diabétiques: angioplastie alternative dans scores intermédiaires

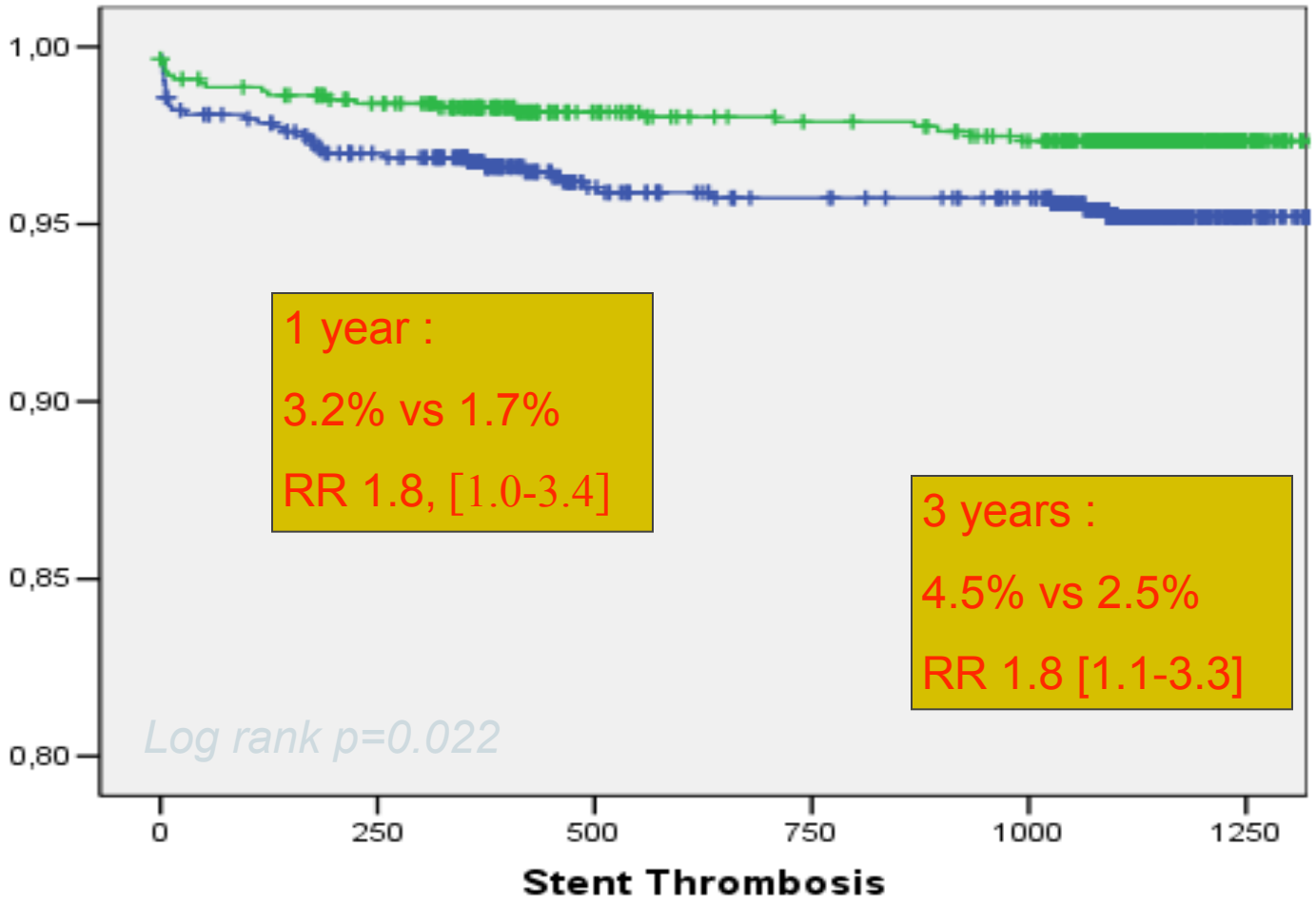
Long-Term Outcomes After Stenting: Restenosis Vs. Progression of CAD



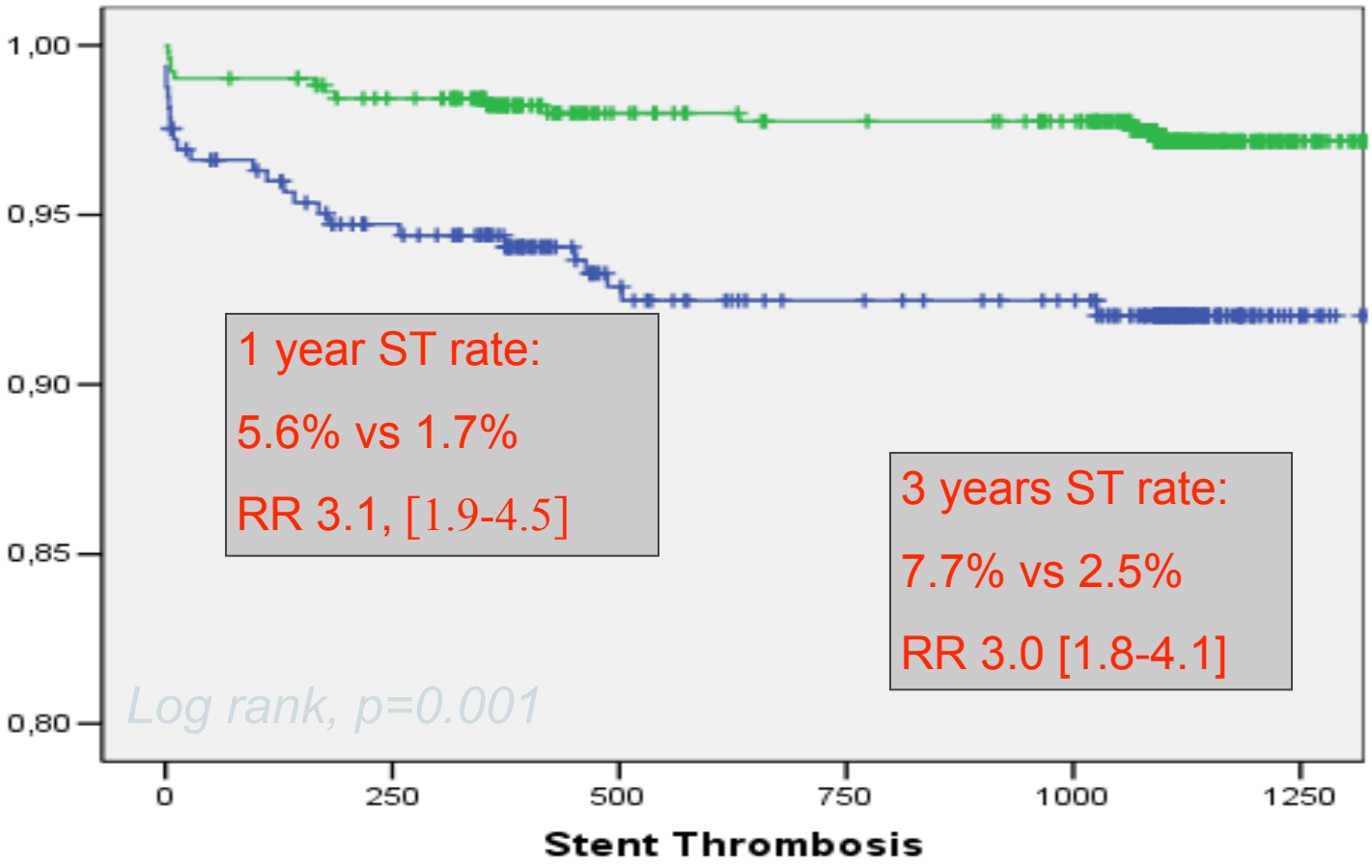
Independent Predictors: Diabetes and Multi-vessel CAD

Cutlip, DE et al Circulation 2004;110:1226-30

Comparison of stent thrombosis rates
Diabetic + vs. Diabetic -



Comparison of Stent thrombosis rate
Ins + db vs. Ins - db

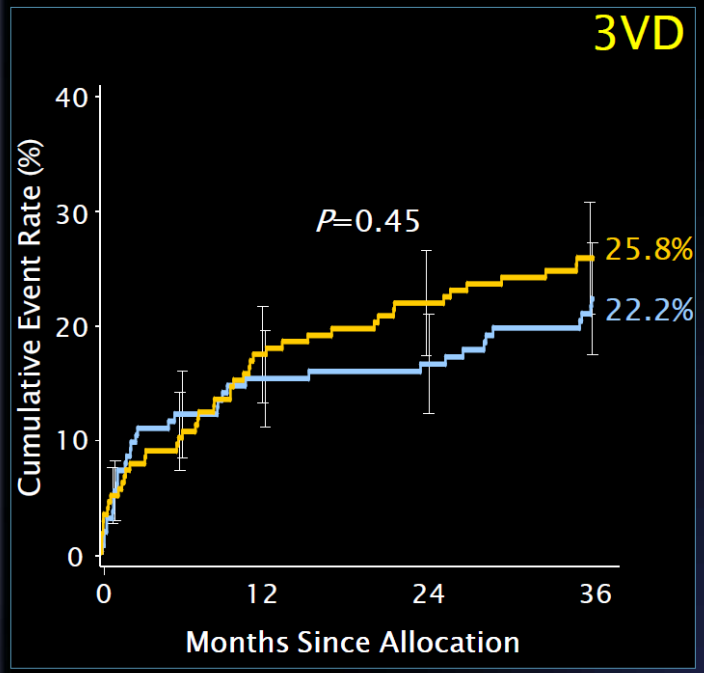


Tri tronculaires « simples »
Angioplastie DES: alternative possible

MACCE to 3 Years by SYNTAX Score Tercile *Low Scores (0–22)*

SYNTAX

CABG (N=171)
TAXUS (N=181)



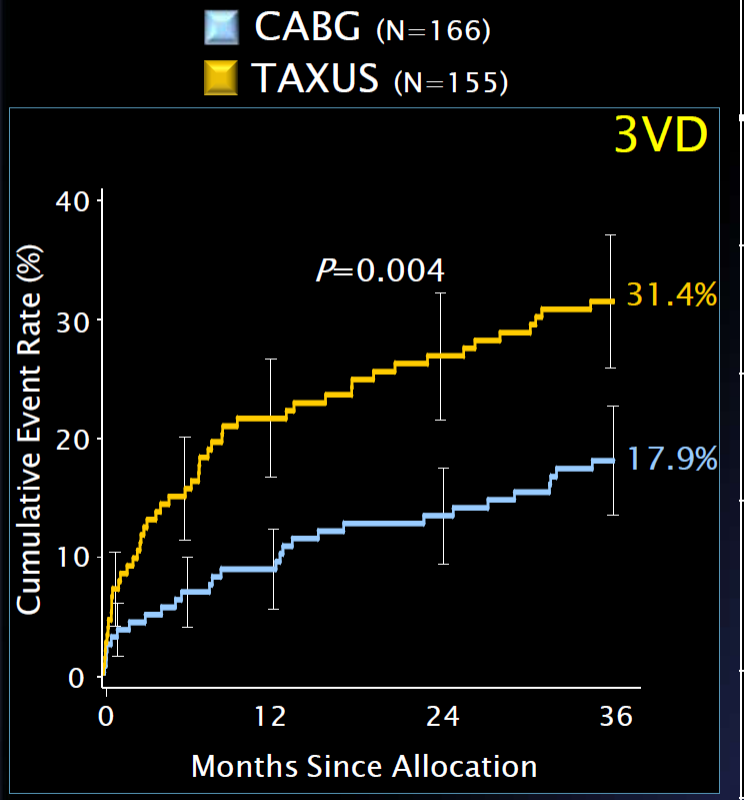
	CABG	PCI	*P* value
Death	6.8%	7.3%	0.86
CVA	3.2%	1.2%	0.20
MI	4.9%	5.1%	0.93
Death, CVA or MI	12.3%	11.2%	0.75
Revasc.	11.6%	18.8%	0.06

Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value

Site-reported Data; ITT population

Choisir l'angioplastie dans les scores élevés: perte de chance pour le patient

MACCE to 3 Years by SYNTAX Score Tercile *High Scores (≥33)*



Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value

	CABG	PCI	*P* value
Death	4.5%	11.1%	0.03
CVA	1.9%	4.3%	0.28
MI	1.9%	7.2%	0.02
Death, CVA or MI	8.3%	17.7%	0.01
Revasc.	10.5%	21.5%	0.006

Site-reported Data; ITT population

TCT 2010 • Three-year Outcomes of the SYNTAX Trial: 3VD Subgroup • Mohr • Slide 18

25% des pluritronculairess dans Syntax

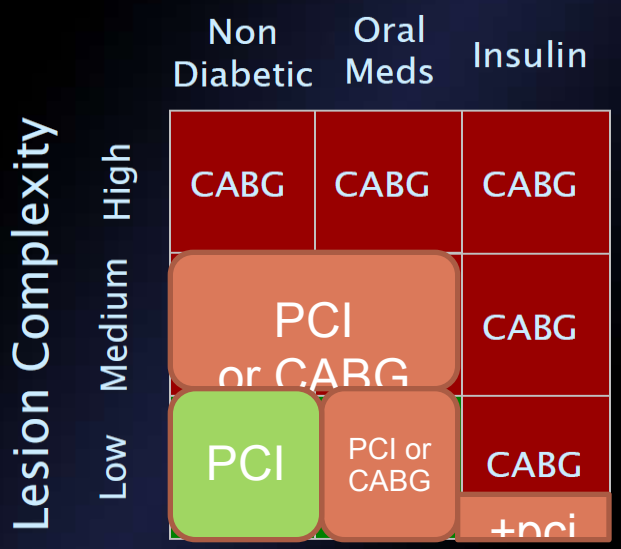
A complexité angio. identique, un patient ira vers la chir ou l'ATL/statut diabét. Surtout si DIR

Conclusion

Patients with 3-vessel and/or left main disease

SYNTAX

Both diabetic status and lesion complexity impact the relative safety between CABG and PES and should be considered when evaluating treatment options in patients with left main and/or 3-vessel disease



Retroactive weighting of the SYNTAX score against 1- and 5-year SYNTAX outcomes will provide treatment algorithms to help determine the best revascularization option for each patient

Les patients insulino requérants iront préférentiellement vers la chirurgie

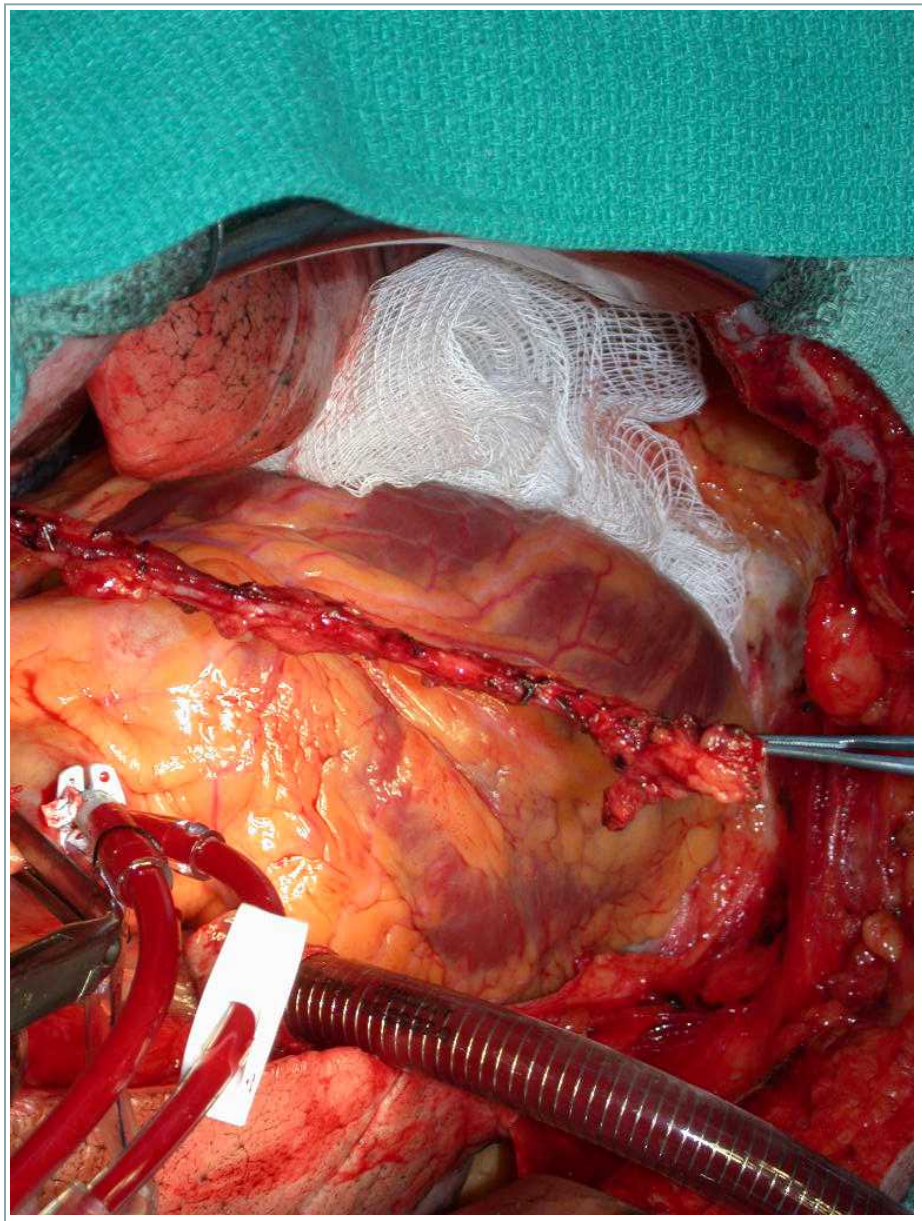
Revascularisation chirurgicale chez le diabétique

Diabétique: à haut risque (DID et rétinopathie++)

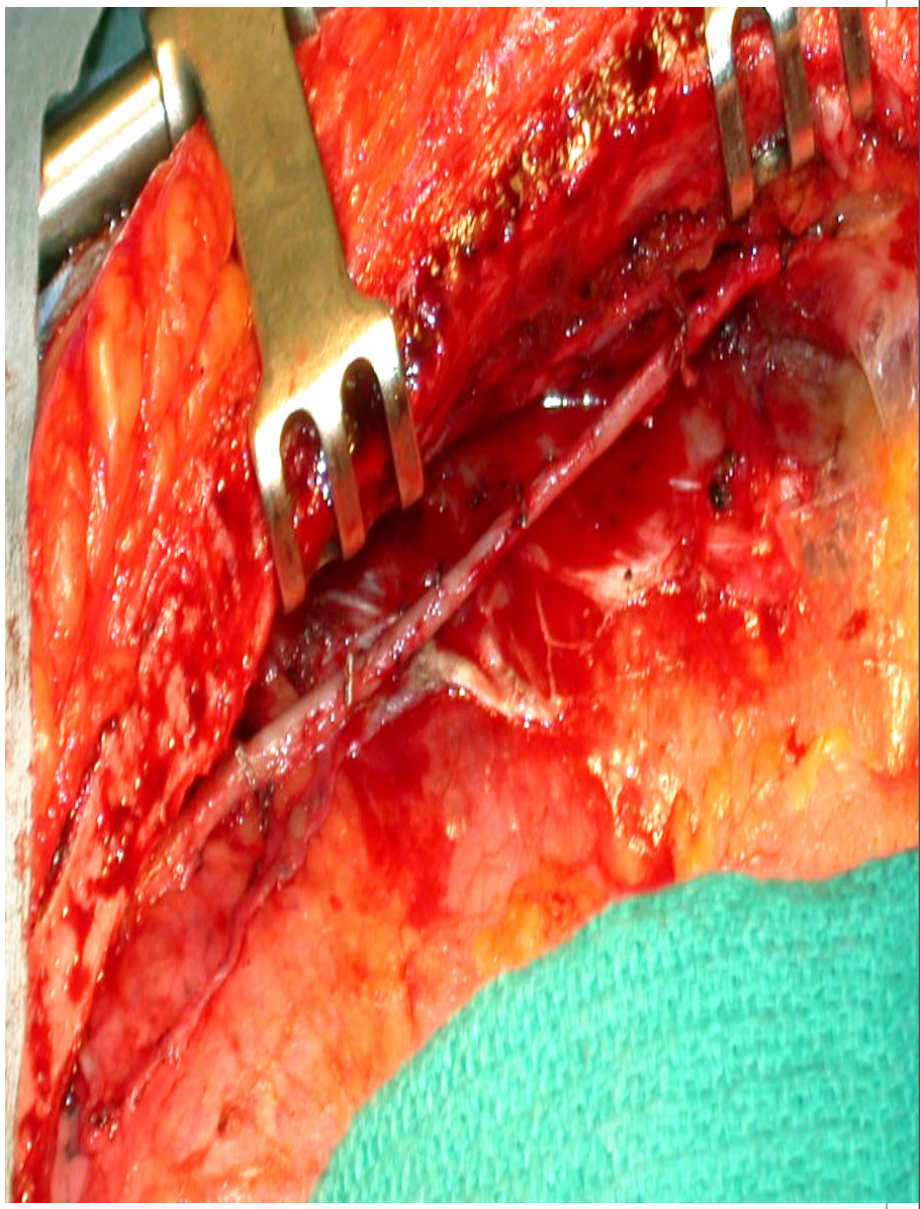
- de décès
- d'AVC, d'I. rénale
- de médiastinite(10% contre 2% ND)
- de complications de réa post op(CEC)

Pas de double mammaire si DID et obésité ou ♀ avec artères grêles.

→ « Squelettisation» d'1 ou des 2 mammaires



Mammaire pédiculée



Mammaire squelettisée

ypass graft

-term benefit of CABG is maximized with the use of grafts, specifically the ITA.[194] Available grafts include horacic, radial, and gastro-epiploïc arteries. All except l artery can remain connected to their anatomical be used as free graft, with the aorta or another graft

e-to-side anastomosis used in arterial and venous grafting an aortic anastomosis, decreases the amount of graft and increases total graft flow. The latter factor contrib- higher patency rate. Partially or total ITA skeletonization its length and possibility of use. Rates of sternal wound and angiographic results are similar whether ITA is skele- r not. These techniques may allow a complete arterial ization.

bilateral ITA is associated with higher post-operative ehiscence and increased rate of mediastinitis in obese bly diabetic patients.[195] But event-free long-term survival, risk of recurrent angina or MI, and reduced need for ion correlate well with the extensive use of arterial

Table 32 Technical recommendations for coronary artery bypass grafting

	Class[a]	Level[b]	Ref.[c]
Procedures should be performed in a hospital structure and by a team specialized in cardiac surgery, using written protocols.	I	B	192, 196
Arterial grafting to the LAD system is indicated.	I	A	194
Complete revascularization with arterial grafting to non-LAD coronary systems is indicated in patients with reasonable life expectancy.	I	A	49, 194, 196, 197, 199
Minimization of aortic manipulation is recommended.	I	C	—
Graft evaluation is recommended before leaving the operating theatre.	I	C	—

Vous avez dit revascularisation chirurgicale ?

- Chez votre patient de 63 ans, vous avez opté pour la chirurgie, mais votre chirurgien préféré se fait tirer l'oreille pour du tout artériel
- Pourquoi pas de l'hybride ??

  Mammaire IVA, stents actifs autres sites

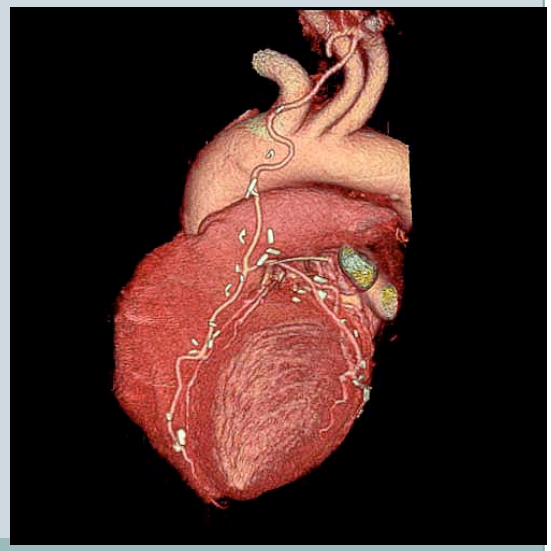
  Pb: par quoi on commence ?

  En général par la mammaire

  sous aspirine

  Parfois revascularisation simultanée

  dans « salles hybrides »



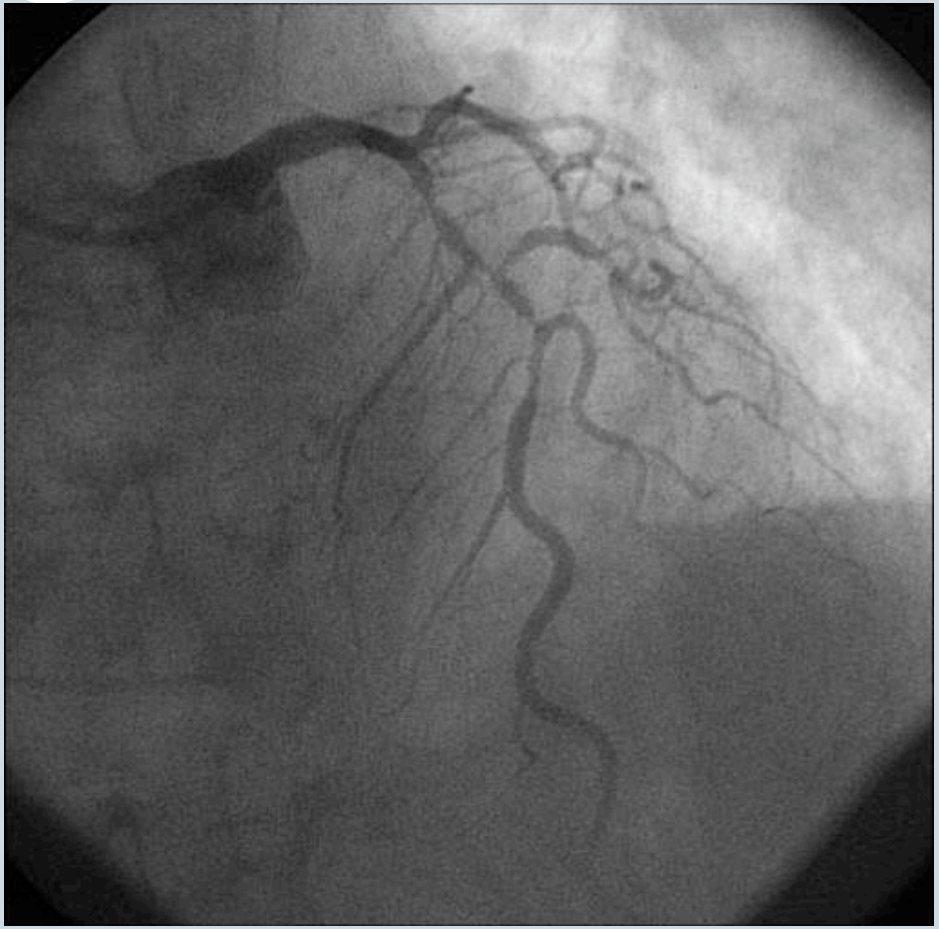
IVA proximale

- Références biblios: méta analyses de 1976 à 2006!
- Non prise en compte du stent actif
- Seule étude randomisée: Thiele, JACC 2009
- 150 pts avec lésion isolée de l' IVA proximale:
- Résultat: non infériorité du Cypher sur AMI mini inv.
- MACE 1 an 7.7% vs 7.7% !
- DC IDM 1.5% vs 7.7%
- TVR 6.2% vs 0%

Après, il y a IVA proximale et IVA proximale !

Patient DNID, ischémie ant au stress
TRT: stent 3.0 x 38 mm everolimus
Stress – à 9 mois

Oui mais quid à long terme?



Résultats stenting tronc ostio médian avec DES,

DES in Non-Bifurcated Unprotected Left Main PCI

TABLE 1. Clinical Characteristics of the Study Population (n=147 Patients)

Age, y	62.6±12.3
Female gender, n (%)	56 (38.1)
Hypertension, n (%)	84 (57.1)
Hypercholesterolemia, n (%)	74 (50.3)
RCA disease, n (%)	51 (34.7)
RCA concomitant treatment, n	22

Continuous data were reported as mean±SD or as median and interquartile range as appropriate. LVEF indicates left ventricular ejection fraction; RCA disease, presence of angiographically critical stenosis in right coronary artery; and RCA concomitant treatment, treatment of right coronary artery stenosis during the index procedure.

TABLE 4. MACE at Hospitalization and at Long-Term Clinical Follow-Up

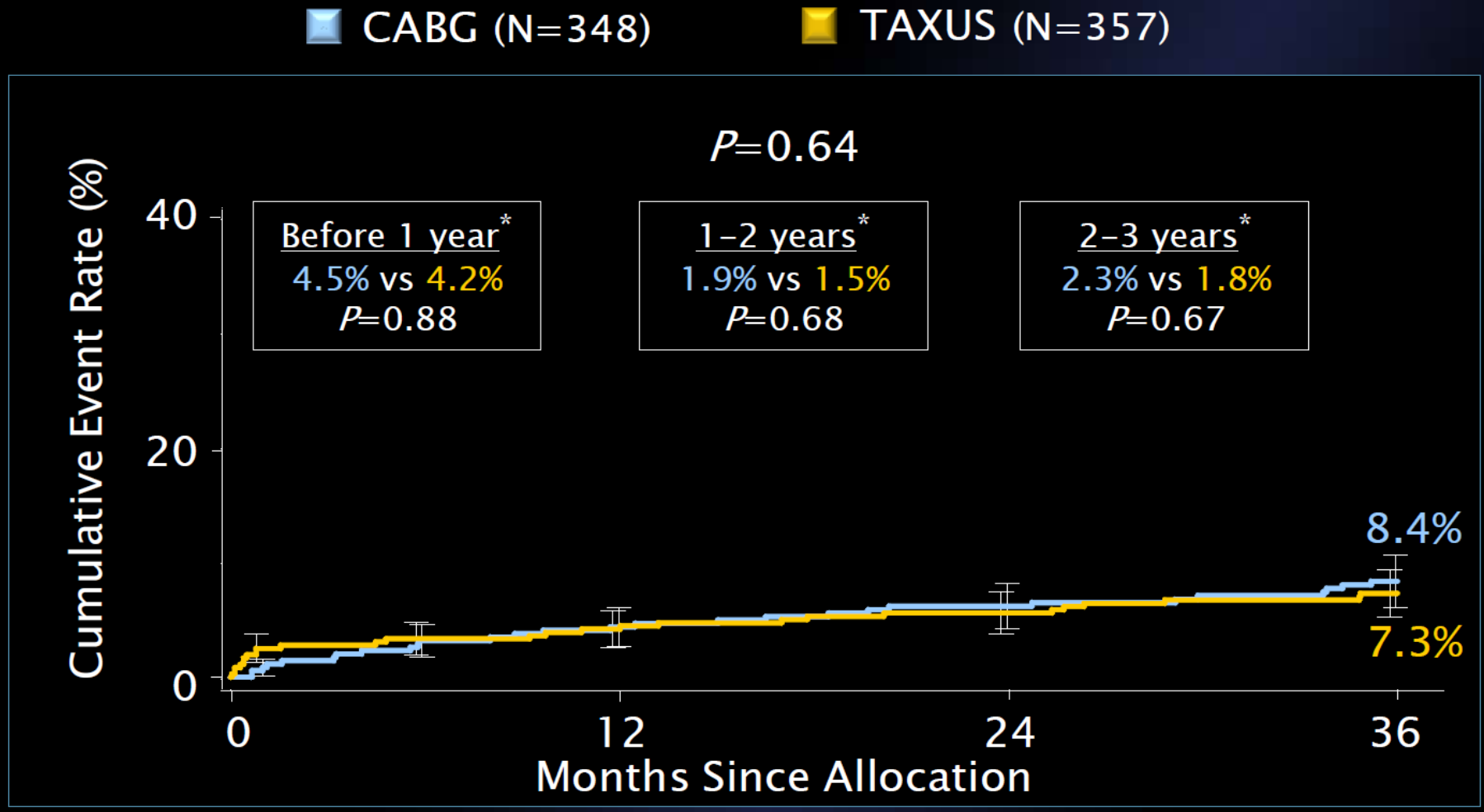
	In Hospital	Follow-Up (886±308 Days)
Cardiac death, n (%)	0	4 (2.7)
TVR, n (%)	1 (0.7)	7 (4.7)
MACE, n (%)	6 (4.0)	11 (7.4)

Data are presented as percentages. The follow-up time is presented as mean±SD. High-risk patients were defined as EuroSCORE ≥6 and/or Parsonnet ≥13 and/or prior bypass surgery with failure of all conduits.

Two year follow-up:
In hospital Mortality -0%
Restenosis 0.9%, Definite Stent Thrombosis 0%,
Long term Death-2.7%
MACE 7.4%, *Stroke Rate of 0%*

Chieffo et al, Circulation 2007

All-Cause Death to 3 Years
LM Subset



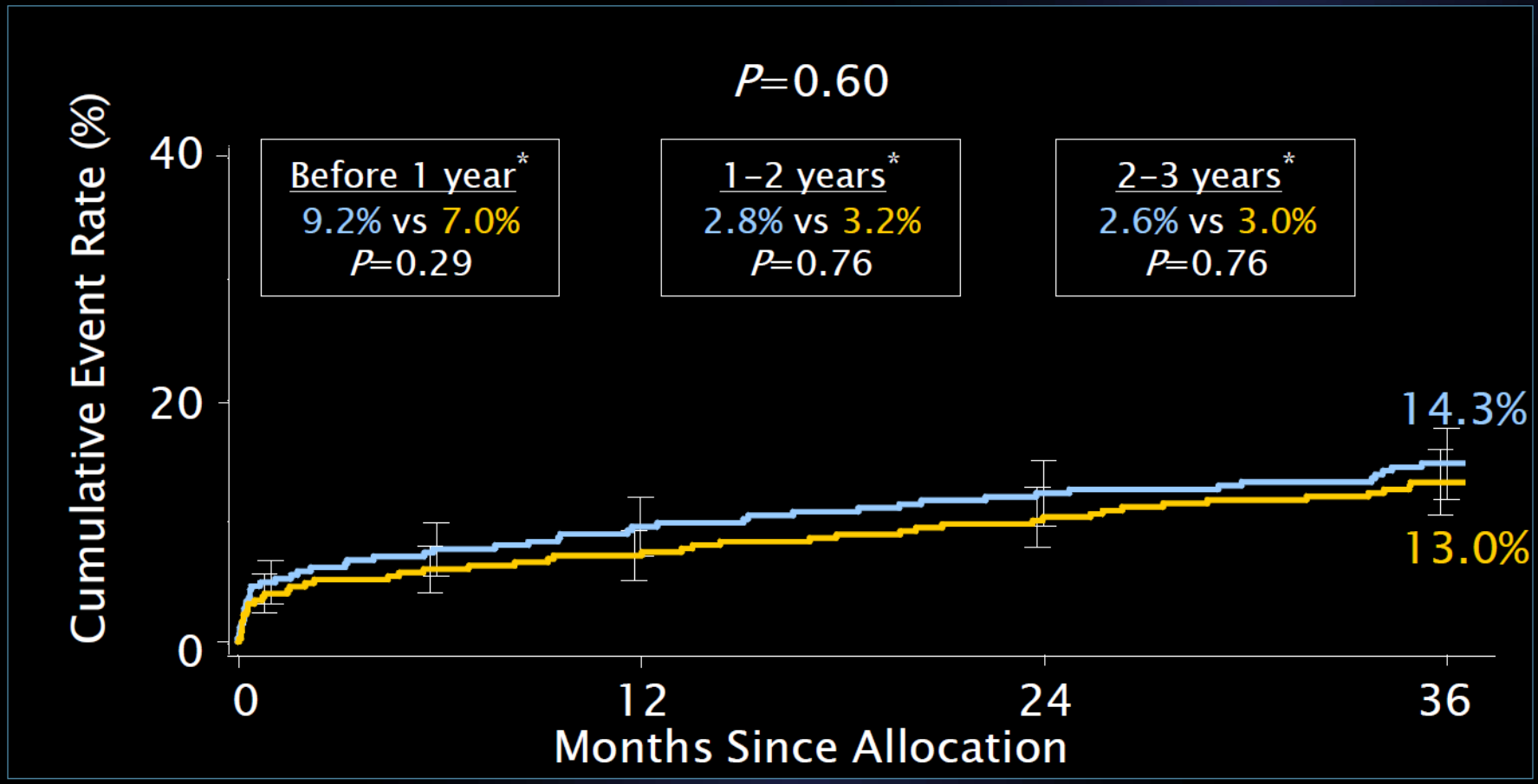
Cumulative KM Event Rate ± 1.5 SE; log–rank *P* value; *Binary rates

ITT population

All-Cause Death/CVA/MI to 3 Years
LM Subset

SYNTAX

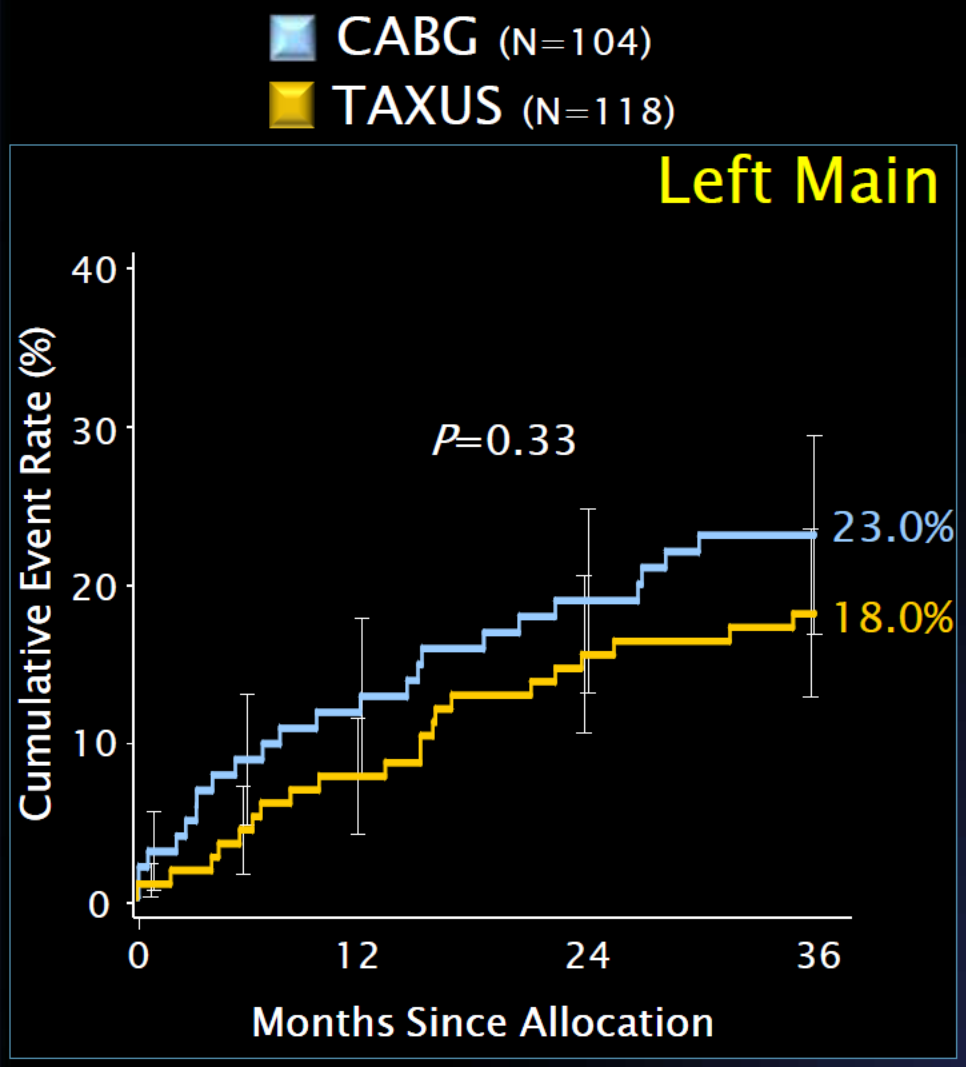
CABG (N=348) TAXUS (N=357)



Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value; *Binary rates

ITT population

MACCE to 3 Years by SYNTAX Score Tercile *Low Scores (0–22)*

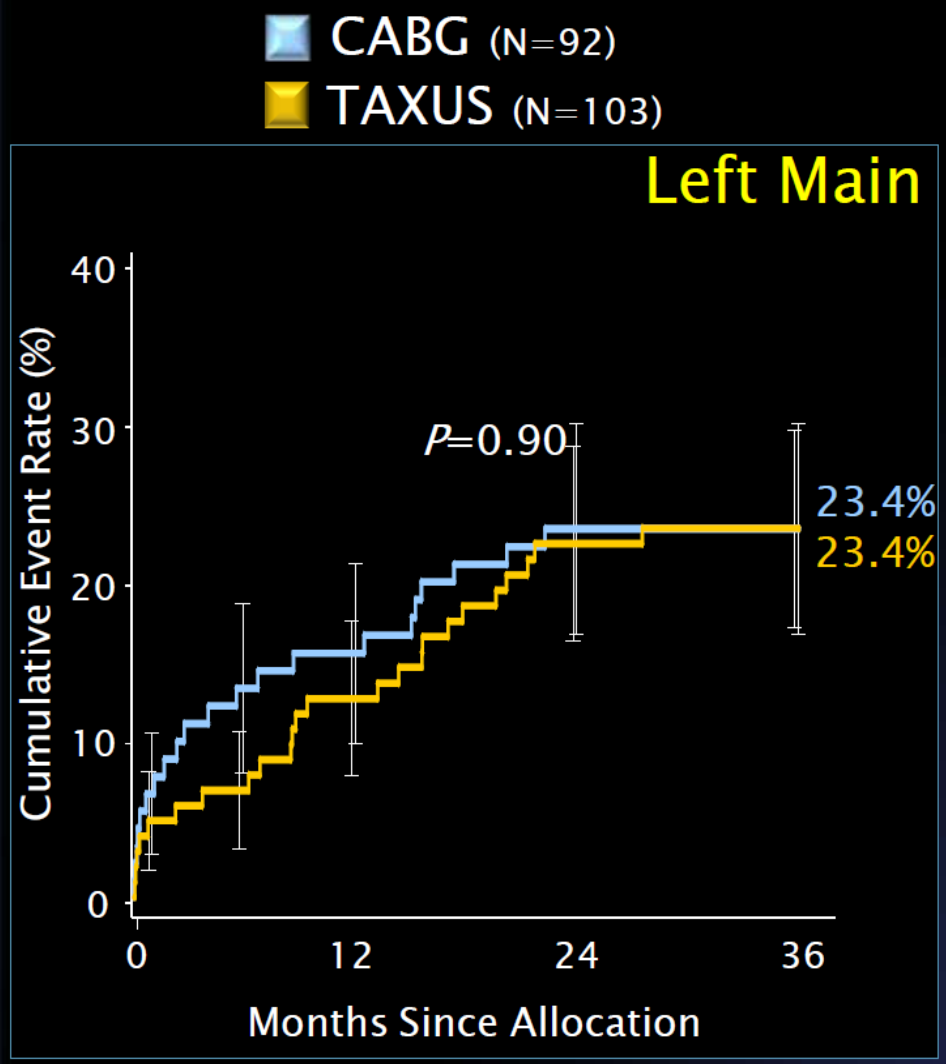


	CABG	PCI	*P* value
Death	6.0%	> 2.6%	0.21
CVA	4.1%	> 0.9%	0.12
MI	2.0%	< 4.3%	0.36
Death, CVA or MI	11.0%	> 6.9%	0.26
Revasc.	13.4%	< 15.4%	0.69

Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value

Site-reported Data; ITT population

MACCE to 3 Years by SYNTAX Score Tercile *Intermediate Scores (23–32)*

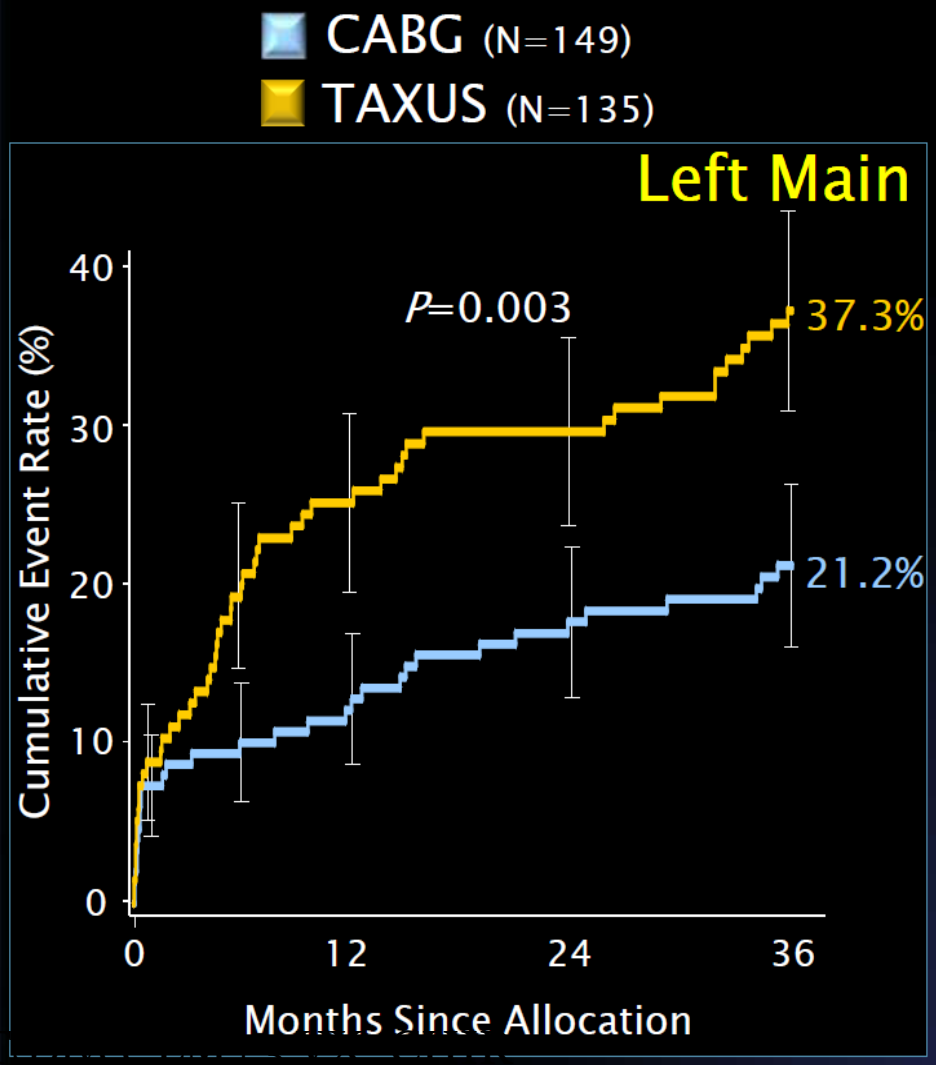


	CABG	PCI	*P* value
Death	12.4%	> 4.9%	0.06
CVA	2.3%	> 1.0%	0.46
MI	3.3%	< 5.0%	0.63
Death, CVA or MI	15.6%	> 10.8%	0.29
Revasc.	14.0%	< 15.9%	0.75

Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value

Site-reported Data; ITT population

MACCE to 3 Years by SYNTAX Score Tercile *Left Main SYNTAX Score ≥33*

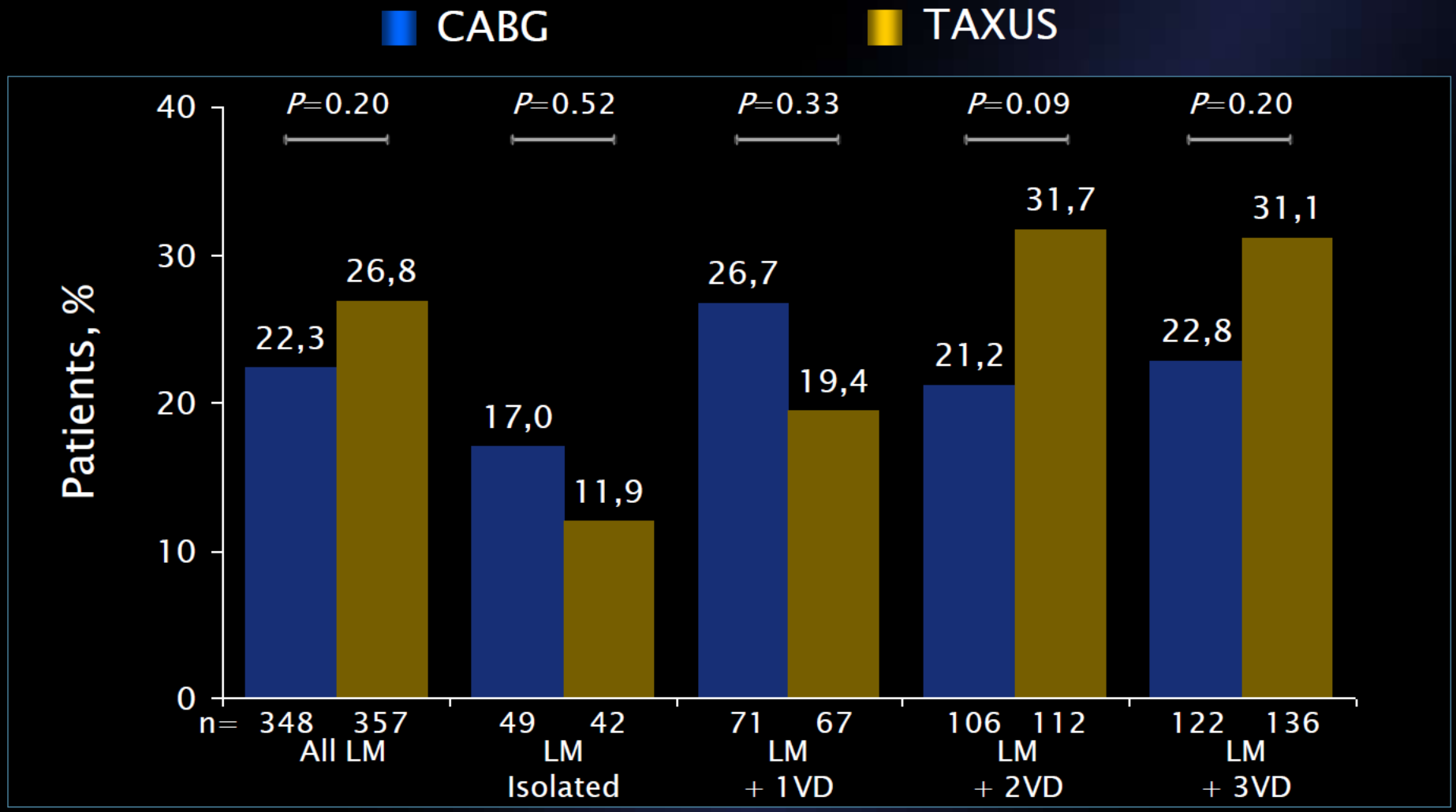


	CABG		PCI	*P* value
Death	7.6%	<	13.4%	0.10
CVA	4.9%	>	1.6%	0.13
MI	6.1%	<	10.9%	0.18
Death, CVA or MI	15.7%	<	20.1%	0.34
Revasc.	9.2%	<	27.7%	<0.001

Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value

Site-reported Data; ITT population

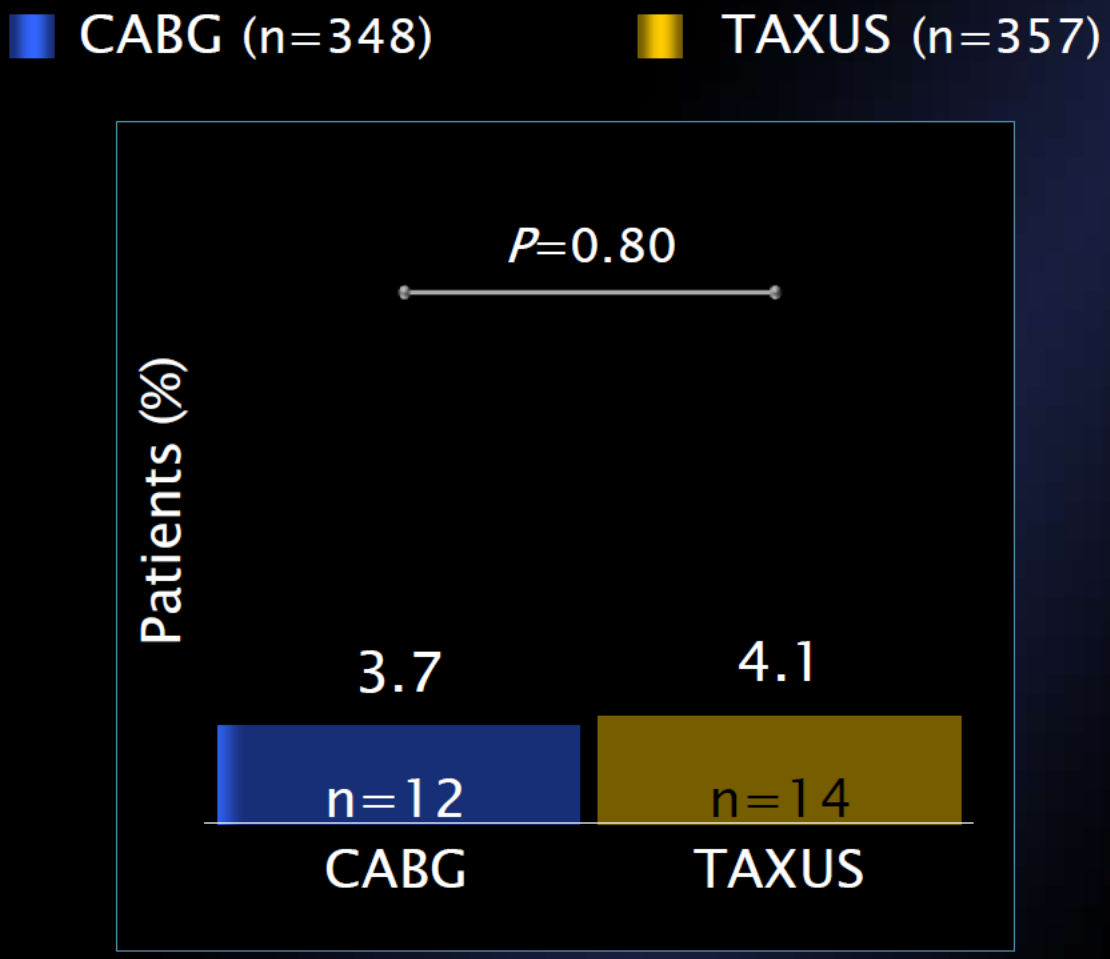
MACCE to 3 Years in LM Subgroups



Cumulative KM Event Rate; log-rank *P* value; *Binary rates

Symptomatic Graft Occlusion & Stent Thrombosis to 3 Years

LM Subset



Post-procedure; ITT population

Conclusions

SYNTAX

For patients with left main disease

- Revascularization with PCI has comparable safety and efficacy outcomes to CABG
- PCI is therefore a reasonable treatment alternative in this patient population, in particular, when the SYNTAX Score is low (≤22) or intermediate (23–32)

Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Subset of CAD by anatomy	Favours CABG	Favours PCI
Left main (isolated or 1VD, ostium/shaft)	I A	IIa B
Left main (isolated or 1VD, distal bifurcation)	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score ≤ 32	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score ≥ 33	I A	III B

Sténoses du TCG

- 1/3 cas, le patient doit aller à la chirurgie (troncs trifurqués, très calcifiés, lésions tritrons associées)
- 1/3 cas, doit aller à l'angioplastie (troncs ostio médians)
- 1/3 cas, discussion: troncs distaux peu calcifiés + 1 à 2 vaisseaux.Les bénéfices et les risques(resténose) doivent être expliqués au patient et à sa famille

J’ai opté pour une angioplastie, maintenant comment je fais ?

- Expliquer au patient et à la famille la stratégie retenue et les conséquences à moyen et long terme (ex: le risque de resténose)
- Planifier sa stratégie

Par quoi je commence ?

A priori par la lésion la plus complexe (ex: occlusion débouchant sur un territoire viable) ou la plus critique.Pouvoir basculer vers la chirurgie en cas d’échec

Cas particulier TCG + CD: commencer par la CD

Quel matériel?

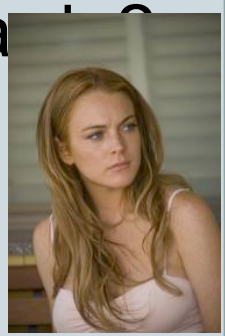
- Quelle voie d'abord ? Radiale?
- Lésions TCG: Evaluation IVUS ?
- Quels KT guides? TCG: 7F ? guides ?
- Lésions calcifiées:Rotablator ?Cutting? Angiosculpt?
- Prédilatation? Stenting direct?
- Quels types de stents? Nus? Actifs ?
- Quels stents actifs? les plus récents et plus performants ou ceux qui ont le plus grand niveau de preuves?

Combien de séances ?

- Chaque fois que possible, en une séance
- Mais pas un dogme ! SAVOIR S'ARRETER !
- A distance de la coro
- Risque de complications ↗ avec durée procédure
-  risque rénal, si 2 séances, espacer de 10 à 15 j
- Hydrater le patient
- Penser à l'irradiation du patient, avoir l'info, changer d'incidence
- Patient âgé : privilégier IVA ou lésion critique

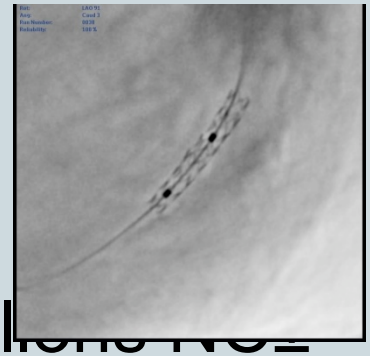
Quelle technique ?

- <u>BIFS</u>: Evaluer les « filles » avant de traiter les mères ! - La fille est elle fluette ou mérite t elle qu'on s'y atta
(provisional T stenting)



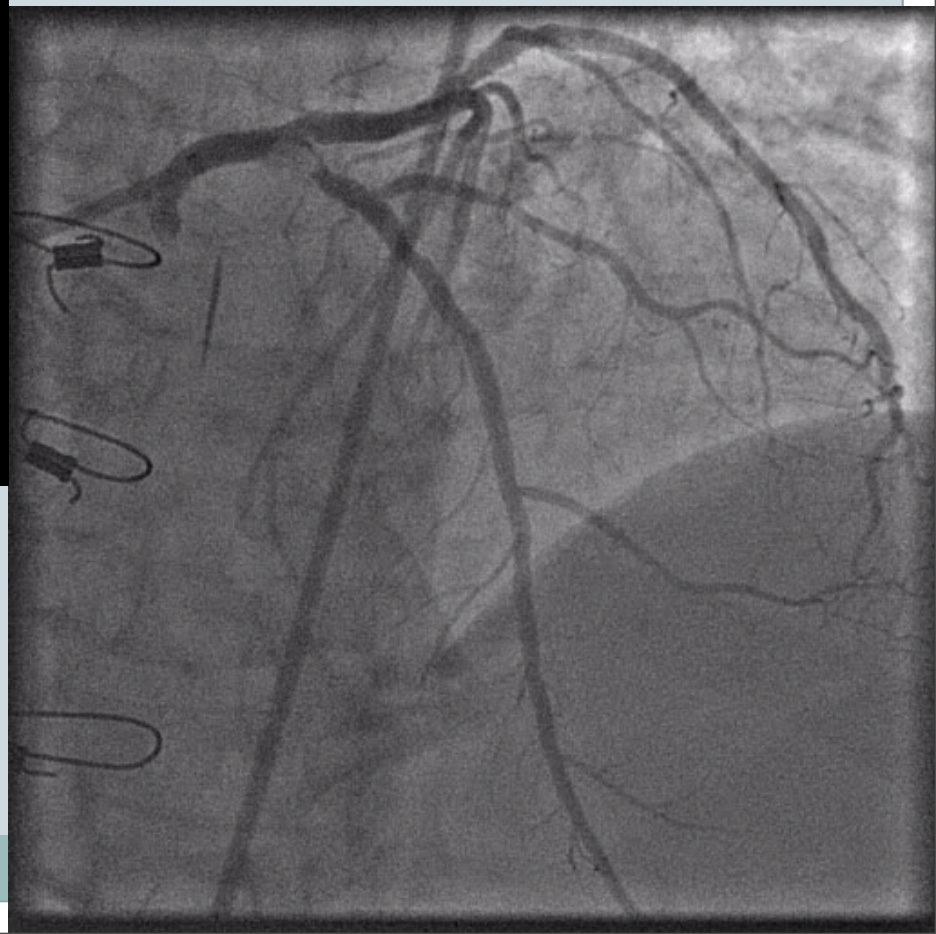
- Parfois les filles sont grandes!IVA ostiale vraie bif.
- Connaitre par cœur la Medina

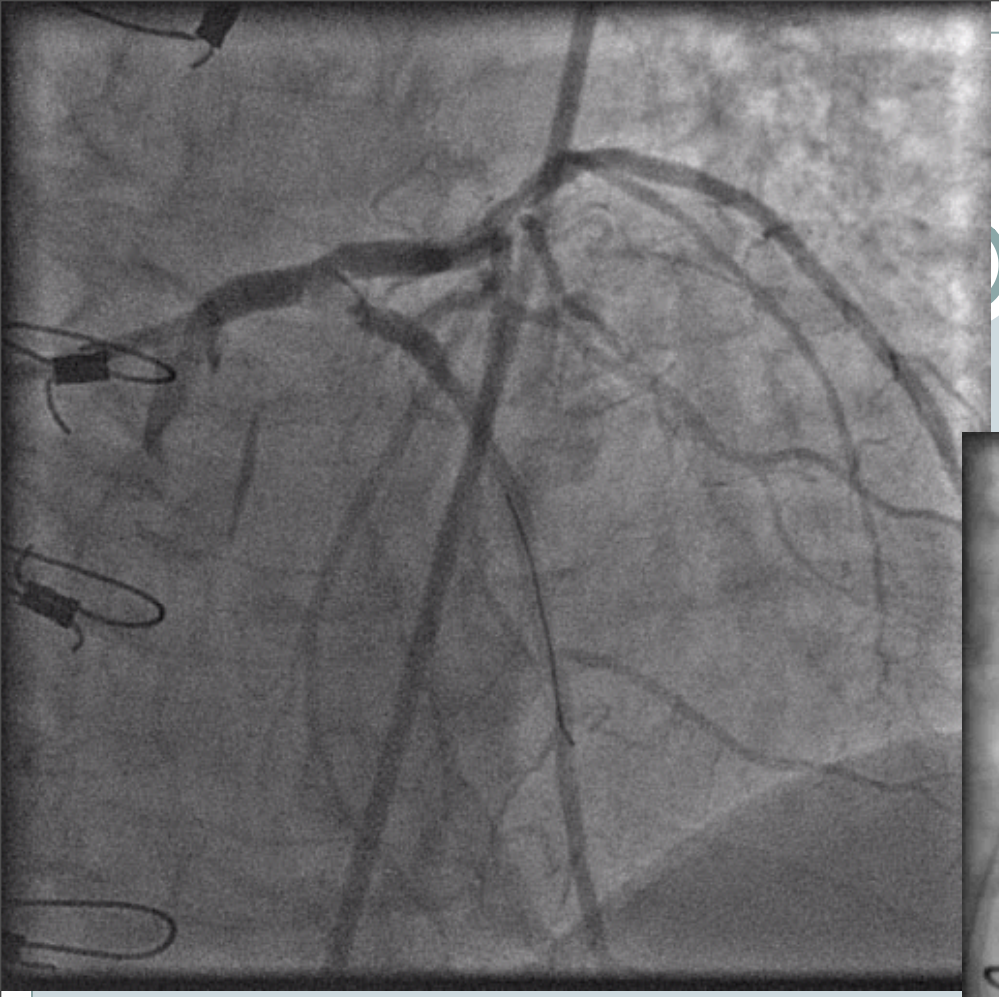
- <u>Longues lésions</u>:
- longs stents actifs,« stents boost »,
- Post dilat Ballons N.C.



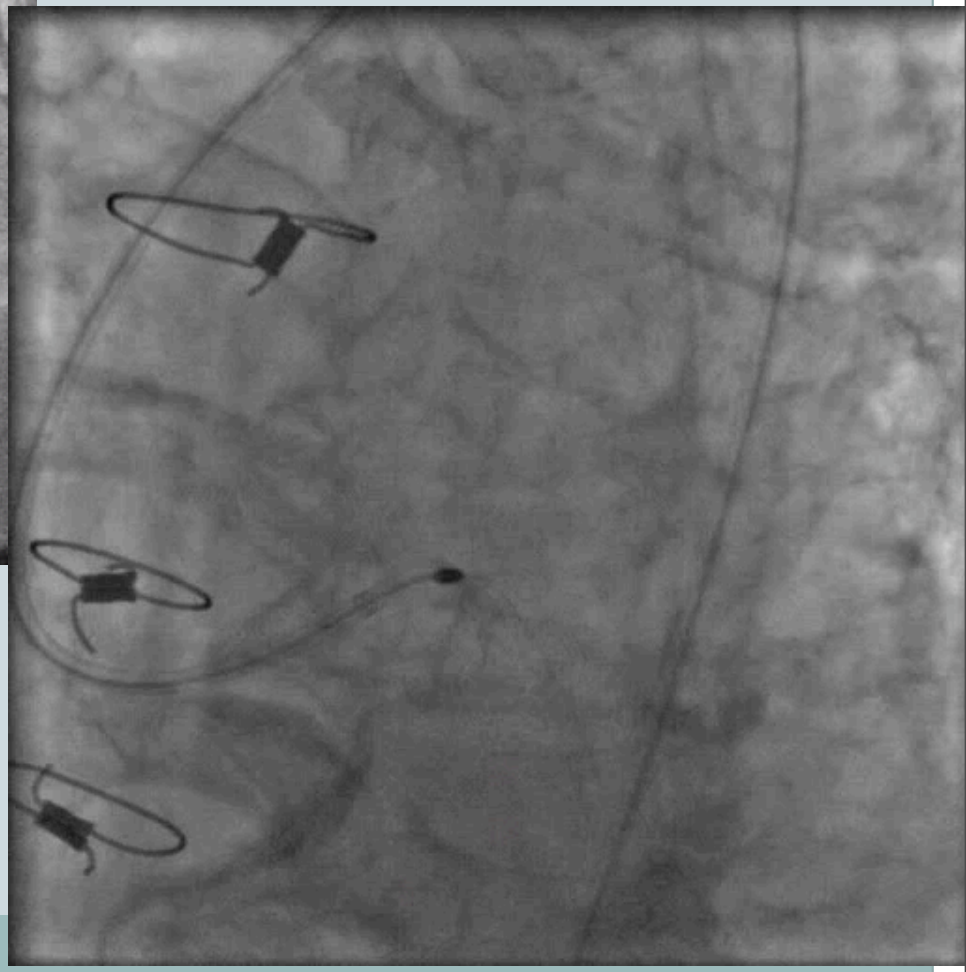
- <u>Lésions très calcifiées</u>: petites fraises puis ballons NC 2è guide.

Mme F.N.,79 ans
Angor non contrôlé
Atcd Prothèse aortique CD dom. N
Sténose excentrée>90% TCG-IVA1 très calcifiée
Passage en EBU 4 7F puis décision Rotablator
Injection bolus integrilin





Franchissement lésion :
Rotawire Extra support



Fraise1.5 puis 1.75mm 200 000 trs /mn
2 passages 20 sec

Après Taxus 3.5X20
Contrôle:inflation à
20 atm

Contrôle après kissing final:
(ballon du stent et maverick 3.O
dans l'ostium cx.)

A 2 ans pte asympto
Stress -

Quel Suivi ?

- Bien insister sur la bithérapie AAP prolongée (≥6mois)
- Carte de porteur AAP
- Idéal: assurer un suivi fonctionnel « actif » de tous les pts pluritroncs stentés (via un ARC?)
- Pas de suivi angio systématique
- Suivi sur symptômes et tests non invasifs (scanner pour le TCG)
- Suivi diabétologue pour pts diabétiques

Conclusion

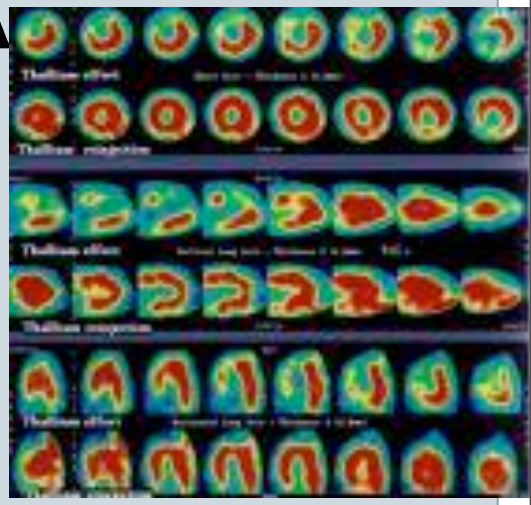
- La décision de revascularisation chez le pt pluritronc. doit être issue d'une réflexion portant à la fois sur l'aspect angiographique et fonctionnel (FFR) des lésions et sur les facteurs liés au patient (âge, diabète, I. rénale, BPCO etc…)
- Le Cardio interventionnel doit donc connaître les résultats à long terme des solutions qu 'il propose au patient et les lui expliquer.
- La décision d'angioplastie ne doit pas être une « perte de chance » pour le patient en terme d'évènements graves.Les patients diabétiques e.p. insulinés et les pluritronculaires les plus complexes doivent aller en général à la chirurgie.

Conclusion (2)

- Le dogme de chirurgie gold standard pour les lésions du TCG est levé depuis Syntax et les bons résultats du Taxus à 3 ans.
- Les nouvelles générations de stents actifs permettent de faciliter la procédure et de diminuer les évènements thrombotiques liés au stent. Ils pourront peut être abaisser encore un peu le taux de resténose mais…
- Leur action focale ne protègera pas les patients de l'évolutivité ultérieure contrairement à la chirurgie
- C'est dire l'importance du traitement et du suivi secondaire des patients pluritronculaires stentés

STENTS ou PONTS?(1)

Pt diab, 03/2008	CABG	PTCA
Age : 78	+	++
DNIR	++	++
A1C <=7%	++	+++
Angor Cl 1	+	++
Ischémie	++	++
Aspect des lésions	++	+++
VG=55%	+	++
Total	11+	16+



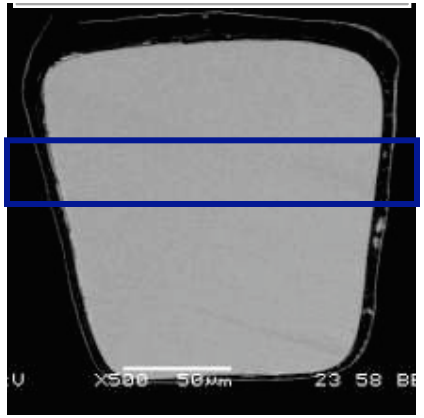
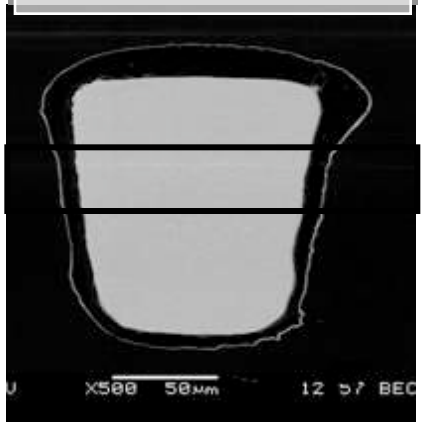
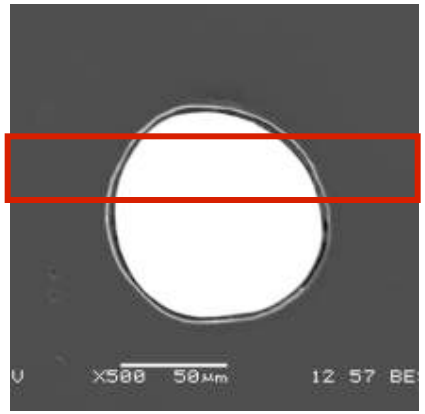
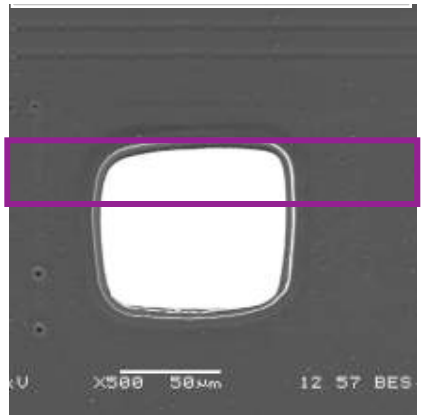
Le patient asymptomatique a de toutes façons refusé la chirurgie
3 angioplasties IVA, Cx, CD avec 3 Cypher Recul à 3 ans: Sympt:0 Stress -

STENTS ou PONTS?(2)

Pt diab, 08/2009	CABG	PTCA
• Age 60	++	++
• DIR	+++	+
• A_{1C}=8.5%	++	+
• Angor Cl 3	++	++
• Ischémie	++	++
• Aspect des lésions	+++	++
• VG=40%	++	+
• Total	16+	11+

1 mammaire IVA, 2 saphènes Mg, CD Va bien à 18 mois

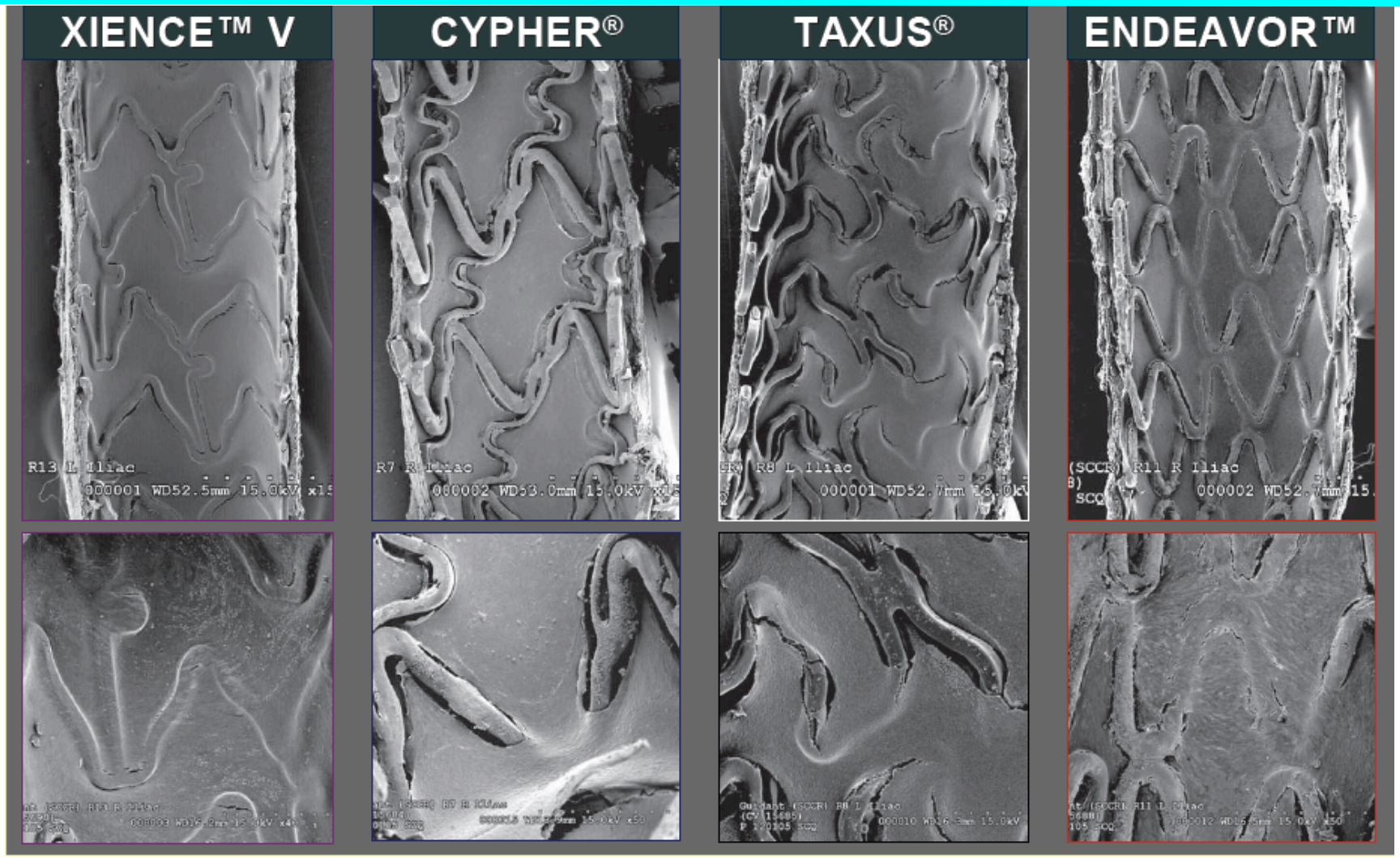
Minimizing Strut and Polymer Thickness

CYPHER®	TAXUS®	ENDEAVOR	XIENCE V
			
Strut Thickness:	Strut Thickness:	Strut Thickness:	Strut Thickness:
140 μm	132 μm	91 μm	81 μm
Polymer Thickness:	Polymer Thickness:	Polymer Thickness:	Polymer Thickness:
12.6 μm	16 μm	5.3 μm	7.6 μm
Total:	**Total:**	**Total:**	**Total:**
152.6 μm	148 μm	96.3 μm	88.6 μm

3.0 mm diameter stents, 500x magnification

Data on file at Abbott Vascular

Reendothelialization: d14 rabbit arteries



Finn and al. EuroInterv 2006

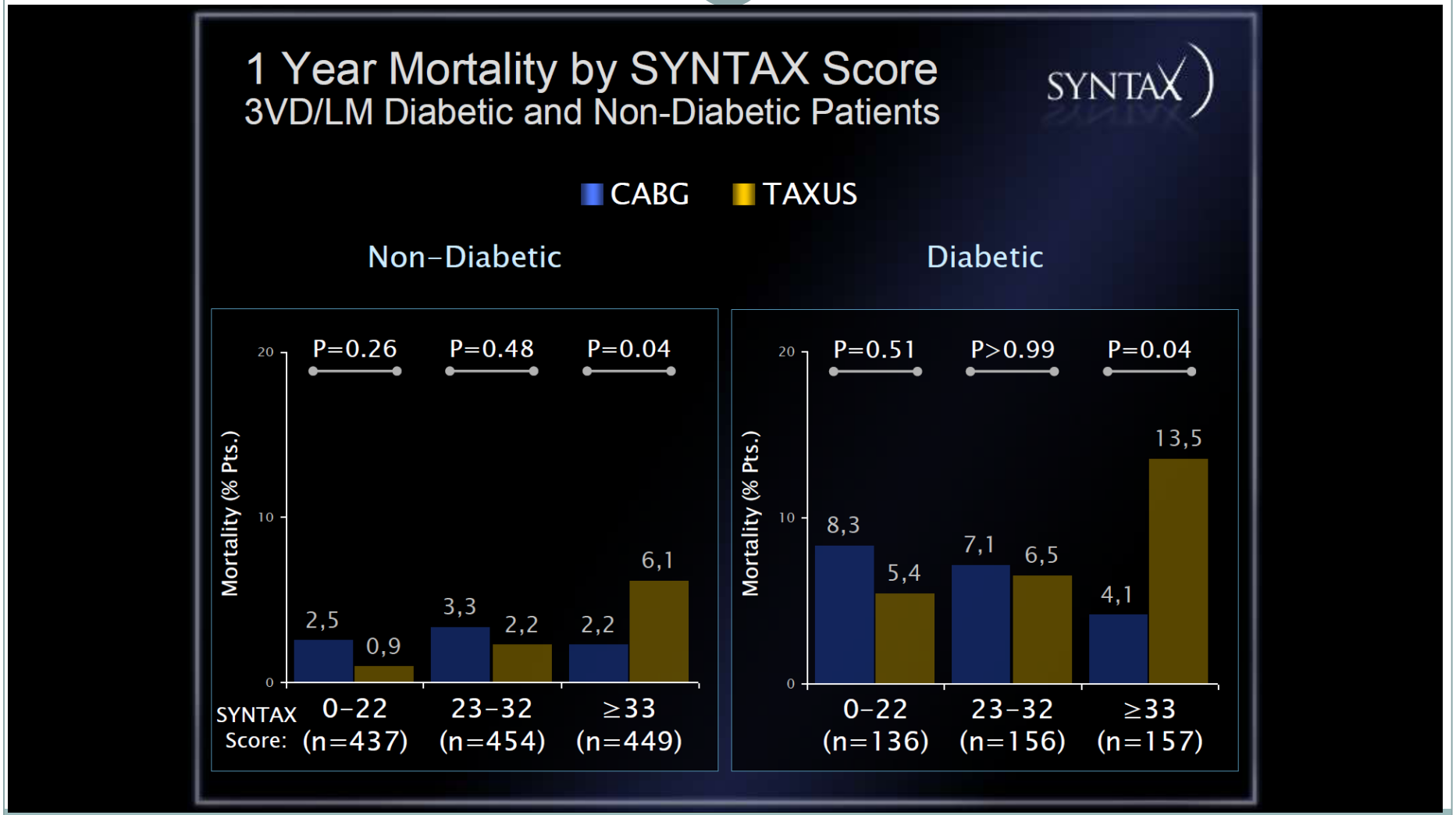
Thrombose de stent actif : Prédicteurs à 1

(e-cypher 13437 pts Urban,CIRC 2006)

	OR	p
• TIMI<3 post procédure	4.4	0.0003
• DID	2.8	0.0001
• Occlusion lésion cible	1.9	0.01
• Lésions calcifiées	1.9	0.001
• SCA tropo +	1.8	0.01
• Pluritronculaire	1.6	0.03

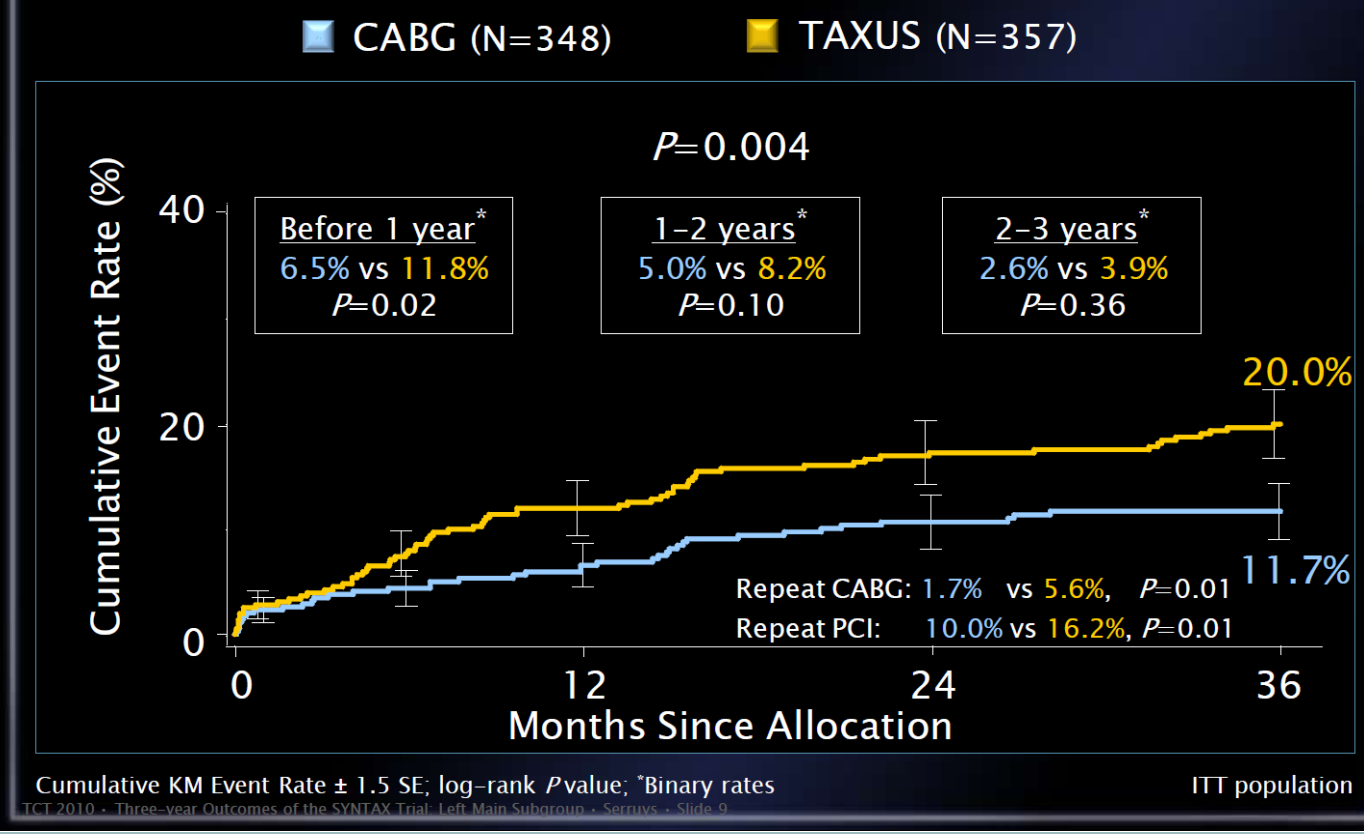
- G. Stone: Basically, the anatomic complexity observed when interventionalists look at lesions does mean something in terms of long term freedom from clinical restenosis and repeat revascularization . . . . Most people will probably not be calculating an exact SYNTAX score, but they'll be using common sense.
- PCI patients had shorter time to procedure (6.9 ± 13.0 days vs. 17.4 ± 28.0 days; $P < 0.001$), procedure duration (1.7 ± 0.09 hours vs. 3.4 ± 1.1 hours; $P < 0.001$), and post-procedural hospital stay (3.4 ± 4.5 days vs. 9.5 ± 8.0 days; $P < 0.001$). However, they were less likely to have complete revascularization than CABG patients (56.7% vs. 63.2%; $P = 0.005$).

Différence de mortalité dès 1 an, diabétique et non diabétique



Repeat Revascularization to 3 Years
LM Subset

SYNTAX



Cumulative KM Event Rate ± 1.5 SE; log-rank *P* value; *Binary rates

ITT population

L'angioplastie du Tronc avec stent actif: le pontage ne fait mieux que sur la nécessité de revascularisation

euro PCR

Meta-Analysis of PCI vs CABG in 3,773 UPLM Patients up to 3 years

Mortality

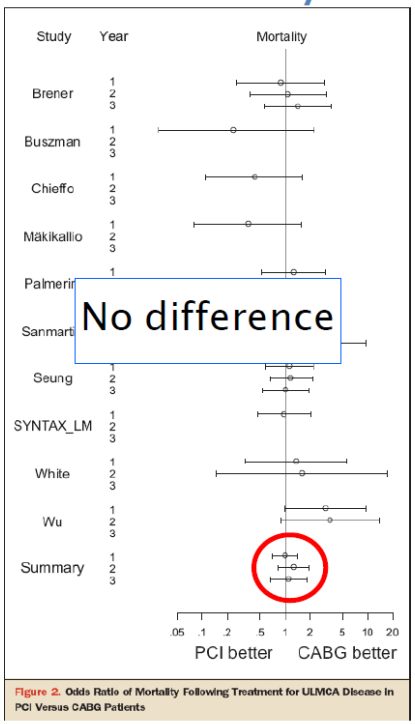


Figure 2. Odds Ratio of Mortality Following Treatment for ULMCA Disease in PCI Versus CABG Patients

MACCE

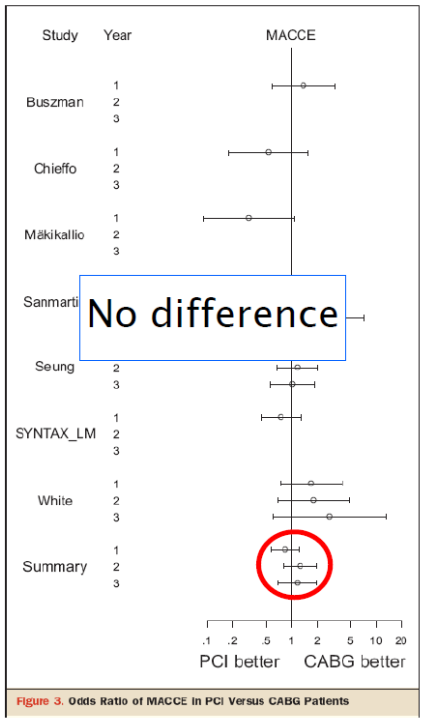


Figure 3. Odds Ratio of MACCE in PCI Versus CABG Patients

Revasc

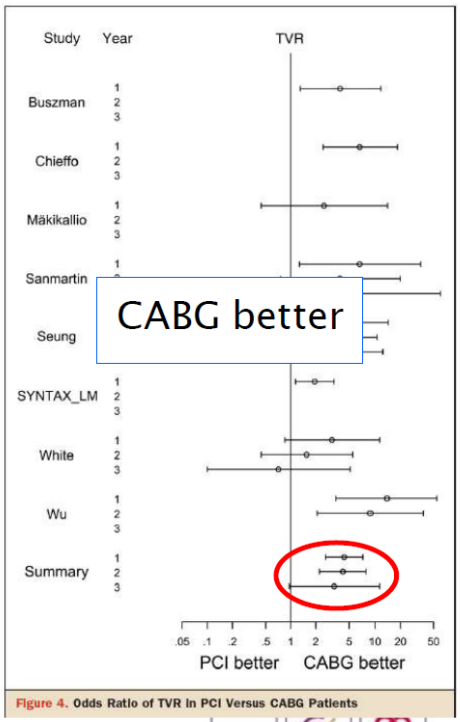
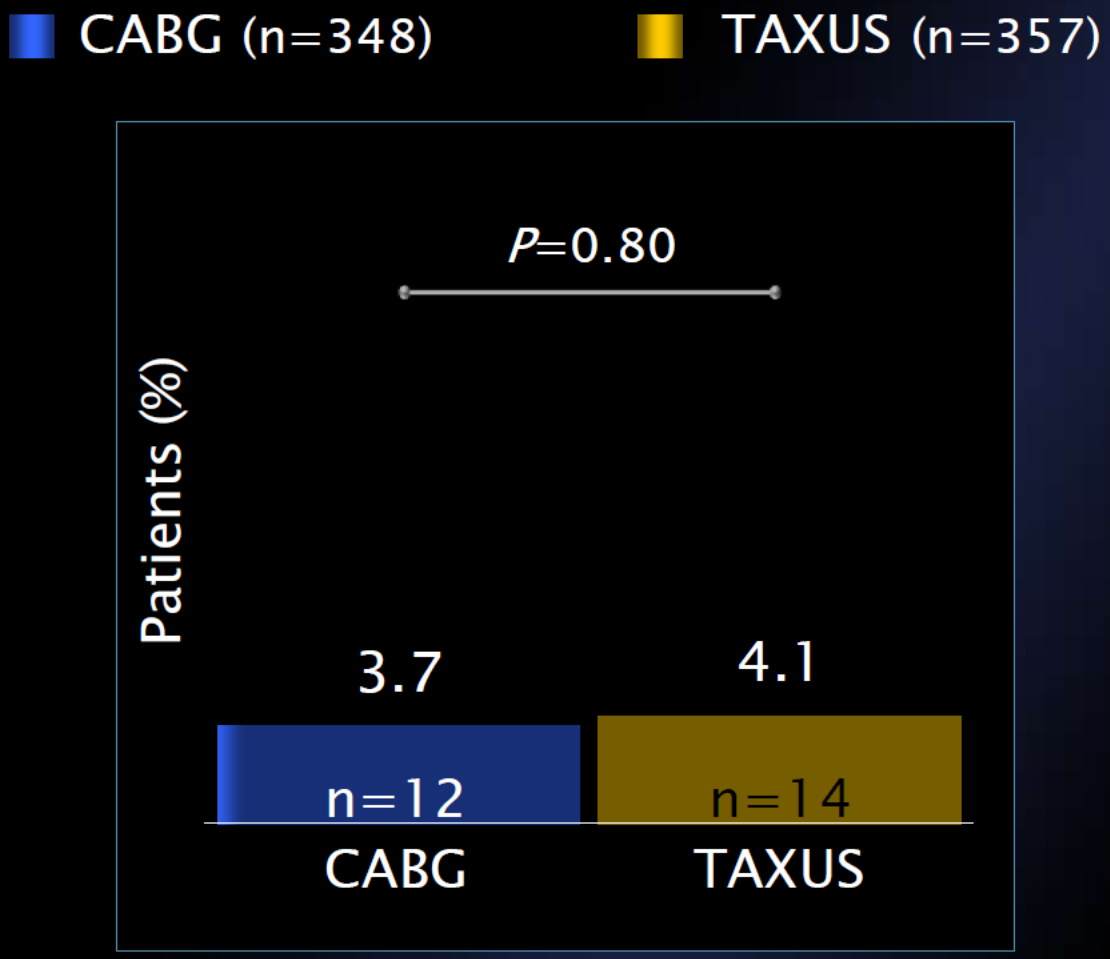


Figure 4. Odds Ratio of TVR in PCI Versus CABG Patients

Naik et al. *J Am Coll Cardiol Intv* 2009;2:738–7

Symptomatic Graft Occlusion & Stent Thrombosis to 3 Years

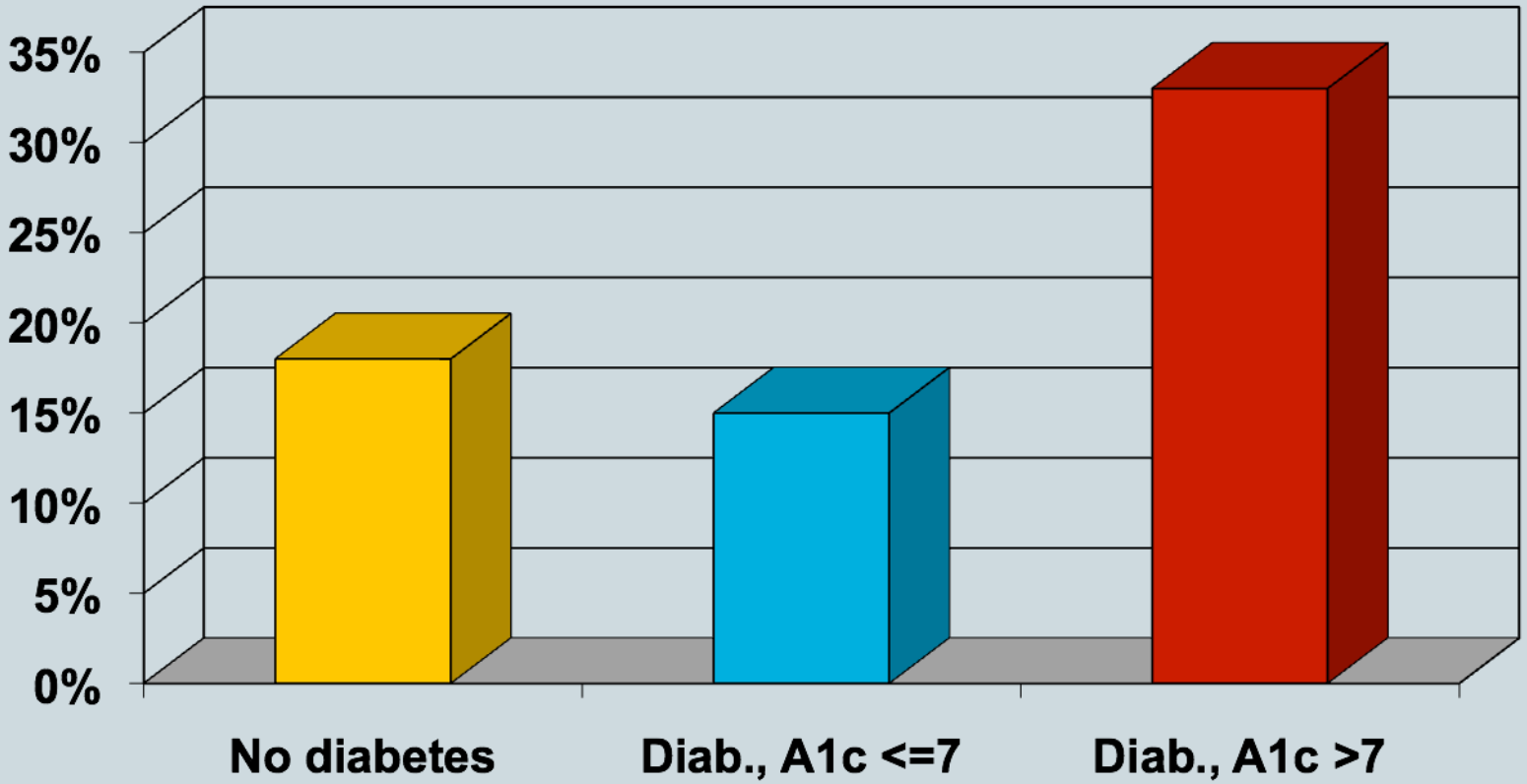
LM Subset



Post-procedure; ITT population

Contrôle glycémique

Corpus, JACC 2004:Hb A1c avant PCI 179pts D. vs 60 pts ND



1 year TVR

Thrombose de stent actif : Prédicteurs à 1

(e-cypher 13437 pts Urban,CIRC 2006)

	OR	p
• TIMI<3 post procédure	4.4	0.0003
• DID	2.8	0.0001
• Occlusion lésion cible	1.9	0.01
• Lésions calcifiées	1.9	0.001
• SCA tropo +	1.8	0.01
• Pluritronculaire	1.6	0.03

SPECT	single photon emission computed tomography
STEMI	ST-segment elevation myocardial infarction
SVG	saphenous vein graft
SVR	surgical ventricular reconstruction
TIA	transient ischaemic attack
TVR	target vessel revascularization
UFH	unfractionated heparin
VD	vessel disease
VSD	ventricular septal defect
VT	ventricular tachycardia
ZES	zotarolimus-eluting stent

1. Preamble

Guidelines and Expert Consensus Documents summarize and evaluate all available evidence with the aim of assisting physicians in selecting the best management strategy for an individual patient suffering from a given condition, taking into account the impact on outcome and the risk–benefit ratio of diagnostic or therapeutic means. Guidelines are no substitutes for textbooks and their legal implications have been discussed previously. Guidelines and recommendations should help physicians to make decisions in their daily practice. However, the ultimate judgement regarding the care of an individual patient must be made by his/her responsible physician(s).

The recommendations for formulating and issuing ESC Guidelines and Expert Consensus Documents can be found on the ESC website (http://www.escardio.org/knowledge/guidelines/rules).

Members of this Task Force were selected by the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS) to represent all physicians involved with the medical and surgical care of patients with coronary artery disease (CAD). A critical evaluation of diagnostic and therapeutic procedures is performed including assessment of the risk–benefit ratio. Estimates of expected health outcomes for society are included, where data exist. The level of evidence and the strength of recommendation of particular treatment options are weighed and graded according to predefined scales, as outlined in *Tables 1* and 2.

Table 1 Classes of recommendations

Classes of recommendations	Definition
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.
Class IIa	*Weight of evidence/opinion is in favour of usefulness/efficacy.*
Class IIb	*Usefulness/efficacy is less well established by evidence/opinion.*
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.

Table 2 Levels of evidence

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

Some surveys have shown that the intended users are sometimes

or proximal left anterior descending (LAD) artery and MVD involving the LAD artery, should be discussed by a Heart Team before a deferred revascularization procedure (PCI or CABG). *Table 6* lists the recommendations for decision making and patient information.

5. Strategies for pre-intervention diagnosis and imaging

Exercise testing and cardiac imaging are used to confirm the diagnosis of CAD, to document ischaemia in patients with stable symptoms, to risk stratify patients with stable angina and an acute coronary syndrome (ACS), and to help choose treatment options and evaluate their efficacy. In practice, diagnostic and prognostic assessments are conducted in tandem rather than separately, and many of the investigations used for diagnosis also offer prognostic information.[12] In elective cases, the pre-test likelihood of disease is calculated based on symptoms, sex, and risk factors. Patients with an intermediate likelihood of obstructive CAD will undergo exercise testing while patients with a high likelihood undergo direct invasive examination. Boundaries defining intermediate likelihood of CAD are usually set at 10–90% or 20–80%. Because of high availability and low costs, an exercise electrocardiogram (ECG) is the most commonly used test to confirm the anginal nature of the symptoms and to provide objective evidence of inducible ischaemia. Its accuracy is limited however, especially in women.[12] Many of the patients with an intermediate likelihood of CAD post-exercise ECG are reclassified into higher or lower likelihood groups after non-invasive functional imaging.

The target of revascularization therapy is myocardial ischaemia, not the epicardial coronary disease itself. Revascularization procedures performed in patients with documented ischaemia reduce total mortality[13] through reduction of ischaemic burden.[14] Discrepancies between the apparent anatomical severity of a lesion and its functional effects on myocardial blood supply are common, especially in stable CAD. Thus, functional assessment, non-invasive or invasive, is essential for intermediate stenoses. Revascularization of lesions without functional significance can be deferred.[15]

Another indication for non-invasive imaging before revascularization is the detection of myocardial viability in patients with poor left ventricle (LV) function. Patients who have viable but dysfunctional myocardium are at higher risk if not revascularized, while the prognosis of patients without viable myocardium is not improved by revascularization.[16,17]

The current evidence supporting the use of various tests for the detection of CAD is based on meta-analyses and multicentre studies (*Table 7*). Few RCTs have assessed health outcomes for

Table 5 Potential indications for *ad hoc* percutaneous coronary intervention vs. revascularization at an interval

***Ad hoc* PCI**
Haemodynamically unstable patients (including cardiogenic shock).
Culprit lesion in STEMI and NSTE-ACS.
Stable low-risk patients with single or double vessel disease (proximal LAD excluded) and favourable morphology (RCA, non-ostial LCx, mid- or distal LAD).
Non-recurrent restenotic lesions.
Revascularization at an interval
Lesions with high-risk morphology.
Chronic heart failure.
Renal failure (creatinine clearance <60 mL/min), if total contrast volume required >4 mL/kg.
Stable patients with MVD including LAD involvement.
Stable patients with ostial or complex proximal LAD lesion.
Any clinical or angiographic evidence of higher periprocedural risk with a *ad hoc* PCI.

LAD = left anterior descending; LCx = left circumflex; MVD = multivessel disease; NSTE-ACS = non-ST-segment elevation acute coronary syndrome; PCI = percutaneous coronary intervention; RCA = right coronary artery; STEMI = ST-segment elevation myocardial infarction.

Table 3 Recommended risk stratification scores to be used in candidates for percutaneous coronary intervention or coronary artery bypass grafting

Score	Calculation	Number of variables used to calculate risk		Validated outcomes	Class[a]/level[b]		Ref.[c]
		Clinical	Angiographic		PCI	CABG	
EuroSCORE	www.euroscore.org/calc.html	17	0	Short- and long-term mortality	IIb B	I B	2, 3, 6
SYNTAX score	www.syntaxscore.com	0	11 (per lesion)	Quantify coronary artery disease complexity	IIa B	III B	4
Mayo Clinic Risk Score	(7, 8)	7	0	MACE and procedural death	IIb C	III C	—
NCDR CathPCI	(5)	8	0	In-hospital mortality	IIb B	—	5
Parsonnet score	(9)	16	0	30-day mortality	—	III B	9
STS score[d]	http://209.220.160.181/STSWebRiskCalc261/	40	2	Operative mortality, stroke, renal failure, prolonged ventilation, deep sternal infection, re-operation, morbidity, length of stay <6 or >14 days	—	I B	10
ACEF score	[Age/ejection fraction (%)] + 1 (if creatinine >2 mg/dL)(11)	2	0	Mortality in elective CABG	—	IIb C	—

[a]Class of recommendation.
[b]Level of evidence.
[c]References.
[d]The STS score is undergoing periodic adjustement which makes longitudinal comparisons difficult.
ACEF = age, creatinine, ejection fraction; CABG = coronary artery bypass grafting; MACE = major adverse cardiac event; NCDR = National Cardiovascular Database Registry; PCI = percutaneous coronary intervention; STS = Society of Thoracic Surgeons.

the proposed intervention, its complications, or the need for late reintervention, especially after PCI.

Informing patients about treatment choices allows them to reflect on the advantages and disadvantages associated with either strategy. Patients can only weigh this information properly in the light of their personal values and must have the time to reflect on the trade-offs

example of a suitable and balanced patient information documer is provided in the Appendix of the online document.

There is growing public demand for transparency regarding si and operator results. Anonymous treatment should be avoided. is the patient's right to know who is about to treat him or her an to obtain information on the level of expertise of the operator an

Table 4 Multidisciplinary decision pathways, patient informed consent, and timing of intervention

		ACS			Stable MVD	Stable with indication for *ad hoc* PCI[a]
	Shock	STEMI	NSTE - ACS[b]	Other ACS[c]		
Multidisciplinary decision making	Not mandatory.	Not mandatory.	Not required for culprit lesion but required for non-culprit vessel(s).	Required.	Required.	According to predefined protocols.
Informed consent	Oral witnessed informed consent or family consent if possible without delay.	Oral witnessed informed consent may be sufficient unless written consent is legally required.	Written informed consent[d] (if time permits).	Written informed consent[d]	Written informed consent[d]	Written informed consent[d]
Time to revascularization	Emergency: no delay.	Emergency: no delay.	Urgency: within 24 h if possible and no later than 72 h.	Urgency: time constraints apply.	Elective: no time constraints.	Elective: no time constraints.
Procedure	Proceed with intervention based on best evidence/ availability.	Proceed with intervention based on best evidence/ availability.	Proceed with intervention based on best evidence/ availability. Non-culprit lesions treated according to institutional protocol.	Proceed with intervention based on best evidence/ availability. Non-culprit lesions treated according to institutional protocol.	Plan most appropriate intervention allowing enough time from diagnostic catheterization to intervention.	Proceed with intervention according to institutional protocol defined by local Heart Team.

[a]Potential indications for *ad hoc* PCI are listed in *Table 5*.
[b]See also *Table 12*.
[c]Other ACS refers to unstable angina, with the exception of NSTE-ACS.
[d]This may not apply to countries that legally do not ask for written informed consent. ESC and EACTS strongly advocate documentation of patient consent for all revascularization procedures.
ACS = acute coronary syndrome; MVD = multivessel disease; NSTE-ACS = non-ST-segment elevation acute coronary syndrome; PCI = percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.

assess all available information, reach a consensus, and clearly explain autonomy, beneficience, non-maleficience, and justice. The